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Contractors and Engineers Monthly

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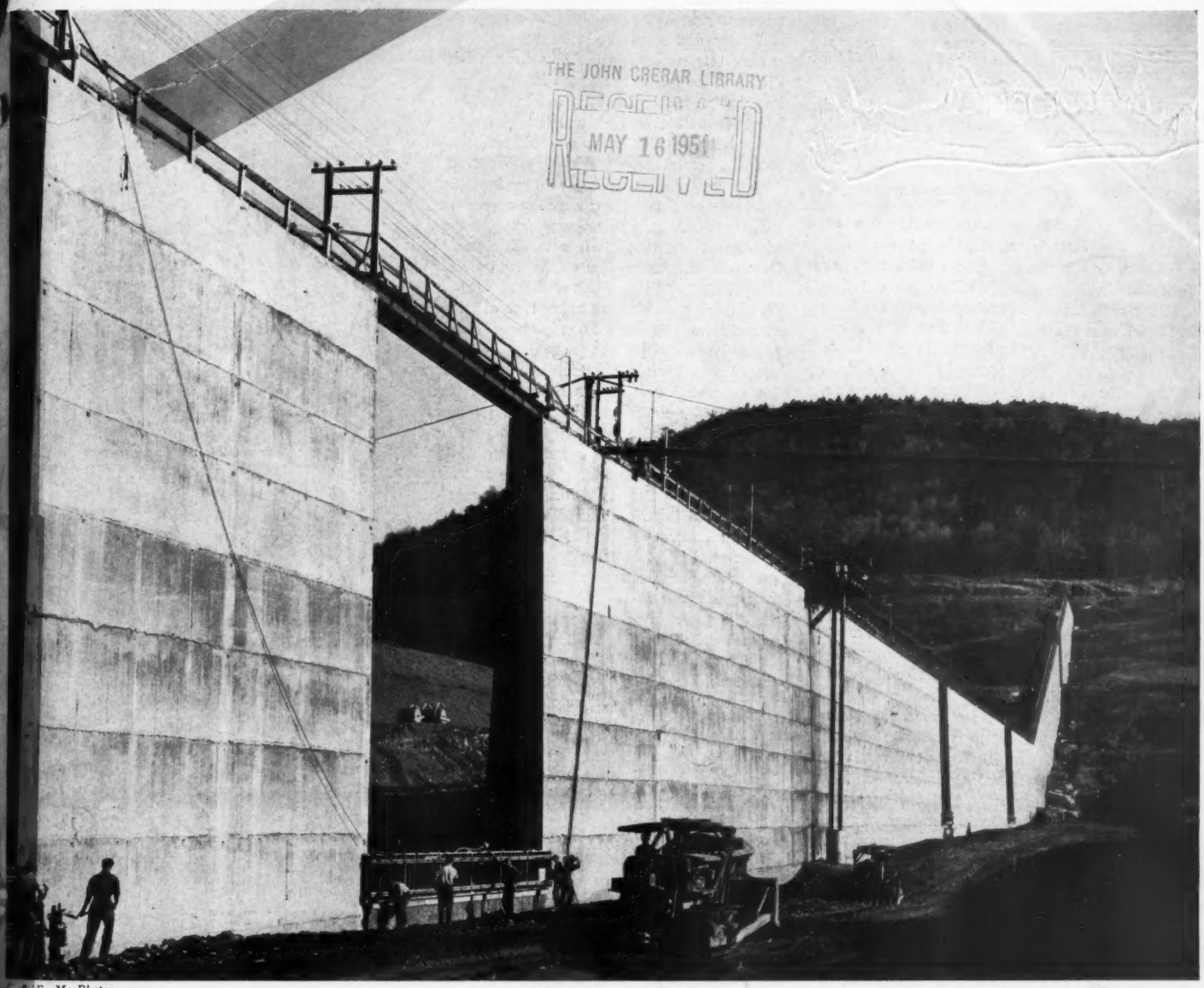


C. & E. M. Photo

A concrete cutoff wall forms the core of Downsville Dam in the Delaware River valley, N. Y. The reservoir created by the dam will augment N. Y. city's water supply. See page 40.

● Safe by Design
Access control and safety features of divided highways make accidents difficult, even for incompetent drivers. Page 3.

● Footbridge Rates Article
The first prestressed-concrete bridge west of the Mississippi River crosses Arroyo Seco in California. Page 5.

● All Kinds of Buildings
A housing project in Connecticut uses steel forms for concrete foundation walls (page 10), Wyoming builds repair shops (page 57), and an atomic reactor presents special problems. (page 71).

● Three Meetings
Highways and defense—chief topic at the ARBA meeting (page 17) and the North Atlantic Highway Officials Conference (page 54). A confab in Utah stresses better engineering, lower costs (page 88).

Covering the Field

● Fifty Years of Contracting
If it's the "biggest", the "tallest", or the "largest", there's a good chance it was built by Thompson-Starrett, the company which claims the N. Y. C. skyline as its by-line. Turn to page 22.

● Grading Wilderness Road
Huge blue-granite rocks, large evergreens, and unpleasantly familiar black bears make road grading in Lolo National Forest interesting and difficult. Page 25.

● Construction in Fiscal '52
There'll be plenty, according to predictions by Corps of Engineers, Navy, Reclamation, and Rural Electrification Administration Chiefs. See page 30.

● Concrete Paving
Michigan's experience with white curing compound—page 34.
Seven miles of 3-lane pavement along the Susquehanna—page 78.

● Water-Supply Dam
Downsville Dam, one of three new dams in the Hudson watershed, will create a 143.5-billion-gallon reservoir. Page 40.

● Bituminous Paving
Kansas reclaims 8 miles with 6-inch soil-asphalt stabilization. Page 49.
Bituminous concrete improves Massachusetts State Route 8. Page 60.
Rock asphalt on coated binder widens Indiana road. Page 91.

● Sewage Plant in Swamp
Running ground and shifting forms, water infiltration and muck up to the knees, were a few of the conditions the contractor contended with. Page 64.

● Radio in Road Maintenance
Radio can save highway departments time, manpower, and paper work. The article on page 84 covers cost, use, and FCC rules.

● Brush Mower
Two years of trial and error have netted the U. S. Forest Service a heavy-duty brush mower which will cut brush 3 inches in diameter. Page 96.

● Inside a Dealer Plant
Ingenuity and efficiency make Peterson Tractor & Equipment Co. an exemplary dealer organization. Page 98.

(You will find "In This Issue" on page 4)

NEWS AND VIEWS

of the construction industry at home and abroad — volume and trends, state and Federal legislation, labor and materials, people

The Government orders that kite past us in bewildering succession these days seem to fall into two categories: first the stern blanket orders, then the more genial reprieves and exceptions. Today it's a reprieve that greets our eye—Order M-43, which says to some 300 prime **manufacturers of construction equipment**, "Boys, we don't want to be hard on you. Henceforth you needn't accept so many defense-rated orders—in fact, only half your average monthly shipments during January to June, 1950. And we'll give you 45 days of lead time for delivery of the orders." This should gladden a few hearts, of equipment makers and buyers alike, since it will tend to keep 50 per cent of the distribution normal, for a time at least.

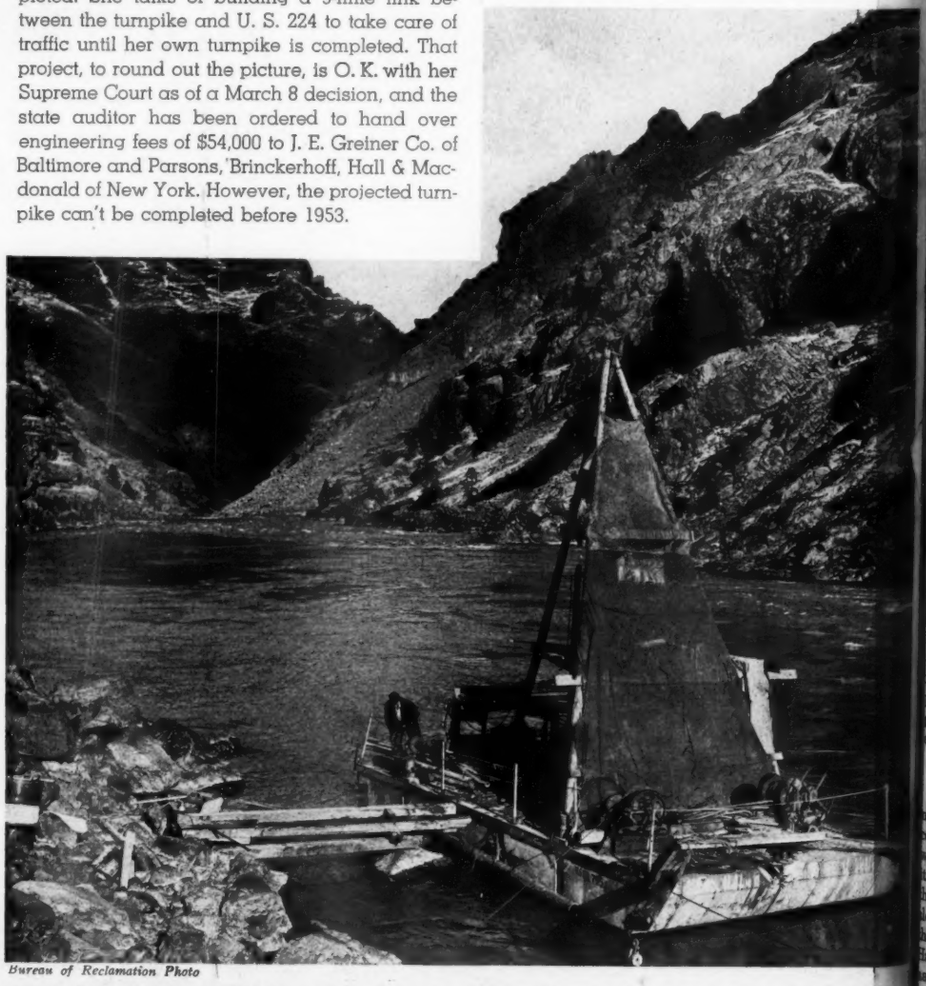
Reprieves are welcome things for the reprieved, but their possibility keeps the unreprieved restless and disgruntled. Take the New York Building Congress, which cries out that **building construction in metropolitan New York will come to a standstill in 6 to 8 months unless Order M-4 is revised,** that the livelihood of some 275,000 workmen is in jeopardy. Even though M-4 permits certain nondefense construction, other orders have nullified it by preventing the use of materials available and actually at the job site. Because of uncertainty, owners have withdrawn from the planning stage millions of dollars worth of construction actually permitted under M-4. New York City, and other metropolises which cannot expect any significant volume of defense construction to take up the slack, deserves special consideration—a reprieve—the Building Congress contends.

So does California, says Governor Earl Warren, **appealing Defense Mobilization Director Wilson's recent pronouncement on steel for highways** (see "News and Views" for March and April). California is checkerboarded with military establishments, he pointed out in a letter to Wilson, and it relies heavily on highway transportation since it has no close network of railroads. **"Our highways are literally a part of our assembly lines** . . . They are the principal means of maintaining a flow of food supplies . . . to our population of nearly 11 million people." Wilson, replying courteously to a state whose population, according to the 1950 census, will net her seven more Congressional seats, said the matter had been referred to the Bureau of Public Roads "for further study". The subsequent letter from BPR Commissioner MacDonald was also soothing. **The National Production Authority expects to have a materials allocation plan in operation by July,** he said. "It is hoped when the plan is put into effect, a definite allocation will be made of the necessary materials for carrying on an adequate highway construction and maintenance program." It is, indeed, devoutly to be hoped.

Speaking of road maintenance, Kentucky is feeling very gloomy these days about its 12,000 miles of roads and the damage they sustained this winter. The bill for it will run to at least $8 million, and has been equaled in that state only twice before—in 1936 and 1947 . . . **Georgia, too,** has had to dig deep into its jeans for maintenance money. It spent about $6 million last year, and overspent by about $1 million. However, in March, Governor Talmadge allocated to the Highway Department another $1.5 million for maintenance.

No less multitudinous than Government directives this year have been the **toll-road bills** pouring out of state legislatures (see "News and Views" for April). **Arkansas** killed such a bill, but she's the exception . . . **Indiana** passed one creating a 4-man toll-road commission with all the necessary powers . . . a **Georgia** bill to create an authority died before the legislature recessed, but a new law authorizes the Fernandina Port Authority to construct toll roads from the Georgia-Florida line to any point within 50 miles of it . . . a **West Virginia** proposal, which had passed the lower house at this writing, would authorize the turnpike commission to study a toll road or freeway from Harpers Ferry to Huntington . . . **Virginia** has chartered a turnpike corporation to build a 75-mile toll "speedway" from Bluefield to Mt. Airy . . . proposals in **Illinois, Michigan, North Carolina, and Wisconsin** would create turnpike authorities . . . **Connecticut and New Hampshire and Maine** are debating extensions of toll roads already in existence. **Pennsylvania and New Jersey** hope to link their turnpikes at the Delaware River. (New Jersey, incidentally, has upped the estimated cost of her 118-mile toll road to about $240 million, and blames the impact of war and rising prices.) **Ohio** is in a dither over the 7,000 vehicles that will begin pouring into her boundaries in November, when the western extension of the Pennsylvania Turnpike is completed. She talks of building a 9-mile link between the turnpike and U. S. 224 to take care of traffic until her own turnpike is completed. That project, to round out the picture, is O. K. with her Supreme Court as of a March 8 decision, and the state auditor has been ordered to hand over engineering fees of $54,000 to J. E. Greiner Co. of Baltimore and Parsons, Brinckerhoff, Hall & Macdonald of New York. However, the projected turnpike can't be completed before 1953.

Over 1,700 piles will be driven to an average depth of [illegible] feet for the new die and fixture building at Caterpillar Co., Peoria, Ill. Raymond Concrete Pile Co. is using the longest all-shell step-tapered pile.



Bureau of Reclamation Photo

In one of the deepest canyons in America, the L. L. Jeffries Co. of Richmond, Calif., is completing the third of three diamond drill holes for Hells Canyon Dam, proposed for construction by the Bureau of Reclamation. Two other holes were drilled midstream to determine the depth of gravel over the bedrock base of the structure.

Can Safety Be Built Into Our Highways?

Access Control Plus Safety Design Features of Divided Highways Make It Hard for Drivers to Have Accidents

By J. C. YOUNG, Traffic Engineer, California Division of Highways

PRACTICALLY all motor-vehicle accidents are caused by people, not roads. National figures indicate that at least 75 per cent of all accidents are directly traceable to failure on the part of at least one of the drivers involved. In my opinion, the percentage is much higher. Even at the points of highest accident concentration on the highway system, the fact that only one out of 40,000 cars comes to grief indicates that this one driver must have been less alert than the 39,999 drivers who successfully negotiated this particular point in the highway. Perhaps the unlucky driver had been drinking, was sleepy, or for some reason was inattentive to his driving, because surely the highway itself was no more dangerous to him than to the other 39,999 drivers.

How then can we decrease accidents by engineering means? The answer is so to design and construct highways that it is difficult to have an accident. The challenge to the highway engineer is to build roads so safe that even the incompetent driver can negotiate them safely. Surely then the careful driver should have no trouble.

Building safety into highways has not been achieved in a single step. It has been a long tedious process of determining the type of accident which is most prevalent and then designing a highway to make it difficult or impossible for that type of accident to occur. This method, however, has its pitfalls, because the very device used to prevent one kind of accident might well be the cause of another type of accident. For instance, a high concrete wall down the middle of a highway will prevent head-on collisions but may result in a number of single-car accidents where vehicles hit the wall. Because of this fact it has taken many years of study of accident patterns and frequencies and many changes in design to develop a safe highway. I am speaking of freeways, (or limited access highways)—a favorite topic of mine, or for that matter, of any traffic engineer, because the facts consistently prove the superiority of this type of highway from an accident standpoint.

Highway improvement was not originally motivated by safety considerations. As a matter of fact, improvements do not always decrease hazards on a highway. Many of our primitive roads are quite safe. On the other hand these roads carry practically no traffic, nor are they capable of handling any great traffic load. The first better-roads movements were aimed primarily at providing a road system on which greater numbers of vehicles could travel at reasonable speeds.

Curves

Probably the first step was to get the motorist out of the mud; in other words, construct smooth, hard-surfaced highways. Except in rare instances, this in itself was not a safety measure. In fact, the mud and bumps on the old roads slowed down traffic to such an extent that accidents were very infrequent. Hard smooth surfaces, on the other hand, tended to increase speeds and brought the highway engineer up against his first problem of removing hazards from the highway—namely, sharp curves. Curves that could be safely negotiated at 10 or 15 miles an hour were frequently the scenes of accidents when smoother roadway sur-

(Continued on page 93)

Professionals will find Mr. Young's review of highway design problems well worth reading in its own right. But more important, perhaps, they will find it an excellent model or sourcebook for their own talks to laymen.

It tells simply and convincingly why safety became a problem on our roads, what road designers have done about it, and what remains to be done. By explaining the why of modern highway design, and—by implication—the why of increased costs, papers as lucid as Mr. Young's can help to win allegiance and financial support for the road program from the general public.

We therefore commend it particularly to those of you who will be out in front this year, trying to win that support.

Removing a bottle-neck from New York-Boston highway

New 24-foot Texaco Asphaltic Concrete pavement for one-way traffic on Massachusetts State Highway 15. Note traffic using old road at left.

At right of Texaco Asphaltic Concrete pavement, a 10-foot parking strip is being constructed with Texaco Asphalt Penetration Macadam.

The highway linking New York City with Boston is one of the most heavily traveled in the country. To cut down travel time and provide greater safety for motorists using this highway, Massachusetts is converting 10 miles of Route 15, beginning at the Connecticut line, from a narrow, winding two-way road into a modern, divided superhighway.

Massachusetts specified a combination of asphalt types of construction for its important Route 15 project. Traffic moving in each direction will be served by a 24-foot wearing surface of hot-mix, hot-laid Asphaltic Concrete, laid in two 1¼ inch courses. The foundation consists of 4½ inches of Asphalt Penetration Macadam, over a 12-inch gravel sub-base. On one side of the Asphaltic Concrete is a 10-foot Asphalt Macadam parking lane, with a 3-foot Asphalt Macadam shoulder on the other side.

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Skullduggery in Defense Transport?

"A man is known by the company he keeps" runs an old proverb. This can well be applied to Federal government officials, with particular respect to the appointments they make. James K. Knudson, Defense Transportation Administrator, made a beaut when he selected John L. Fraley as his consultant on street and highway maintenance. Fraley was formerly assistant to the president of the Carolina Freight Carriers Corp. of Cherryville, N. C., a trucking firm that has been caught no less than 665 times violating the truck-weight laws of Virginia. Incidentally, the president of this corporation was also president of the North Carolina Truckers Association.

So what happened? In the name of national defense, Knudson sent urgent letters to all state governors telling them that, in order to speed up the movement of truck cargo, they should relax their truck-weight laws. The truckers couldn't ask for anything better than that. But the American Association of State Highway Officials, which includes highway department heads of the forty-eight states, has not fallen for such skullduggery in the name of national defense. Highway officials have been insisting that roads are not expendable, and they charge the Defense Transportation Administration with trying to break down the enforcement of state truck laws.

Jimmie Anderson, hard-boiled President of the AASHO and Virginia Highway Director, is fighting the DTA. He has seen to it that Virginia laws on overloading are strictly enforced. North Carolina, which has milder truck laws than many states, has in the past been tolerant of overloading, and Knudson would like it to stay that way. The Tar Heel state, by the way, is headquarters for many large eastern truckers. But the North Carolina State Highway and Public Works Commission is not proving subservient to the voice of Washington. It is planning to cooperate with the Motor Vehicle Department in carrying out proposed legislation designed to enforce more strictly truck-weight laws on state highways.

North Carolina has been engaged on a vast scale in building secondary roads which can very quickly be broken up if these truckers are permitted to do as they please. Should these new farm-to-market roads go the way of all highways that are subjected to overloading, the voters may start asking embarrassing questions.

It is up to all state highway departments to resist this insidious pressure from Washington. While the voice may be the voice of DTA chief Knudson, the hand maneuvering behind the scenes is the hand of the trucking firm that holds state weight laws in such fine contempt.

Foreign Contracting Earns Friends

Foreign construction programs have handed to many American contractors one of the best opportunities our country ever had to show foreign people how democracy works in the United States. There isn't a better demonstration of Americans at work anywhere than on a typical construction job. The overseas rehabilitation performed by Yankee builders since V-J Day has already earned the gratitude of many peoples, and demonstrated something they like.

Overseas American contractors can take a bow for past accomplishments, for they and their construction men have done a first-class promotional job. As ambassadors of good will, they rate higher than our State Department. But much more remains to be done along this line. The period through which we're passing is critical. Contractors cannot afford to relax for an instant their foreign-relations programs which so far have earned many new friends for themselves and their country.

There is a line of thought, gaining in popularity, that America should raise the standard of living of all the free world through leadership in trade relations. If she could do this, standards in the Soviet orbit would suffer by comparison. Pressure would build up for the dictator-controlled countries to come in line.

If that philosophy makes further headway, American contracting firms rank very high on the potential scale of good will. Good roads, exploitation of water and soil resources, sanitation and airport development—all promise to raise the standard of living of many foreign nations.

It goes without saying that the same high ethical policies which prevail among contractors at home should be extended to foreign nations. Good work for the contract price should be a cardinal rule. Competition must be encouraged, because many a foreign nation has already seen far too much exploitation which operates under the smoke-screen of monopoly. Abuse of free competition would likely be the one thing most foreign countries would notice first—and resent most.

On the other hand, sound construction programs which help the nations to help themselves cannot fail to be helpful to everybody. Foreign people will learn new skills . . . and possibly, in the interchange, America might likewise learn from other people whose skill matches or excels her own. There is a tremendous challenge. America has an asset in her contractors. By applying their know-how to foreign fields, they lead the way toward the fulfillment of our responsibility to the free world.

Practical Courses Wanted by CE Grads

"We wish there was more emphasis on the practical side of the engineering courses given in school", said a number of recent graduates in reply to a questionnaire sent out by the Junior Branch of the Metropolitan Section of the American Society of Civil Engineers. The majority of the 300 replies indicate that more stress should be laid on the fundamentals of construction—estimates, costs, plant, and management. Other subjects high on the list were contracts and specifications, valuation and appraisal, economics, public speaking, report writing, foundations, reinforced concrete, business law, personnel and labor relations, drafting and surveying.

On methods of presenting material, most said that field trips should get a greater play, and the consensus was for information presented with emphasis on its practical application. Classroom instruction was criticized as having degenerated in some cases to "heavy note-taking sessions" with little student participation; visual aids were suggested as one tonic for this ailment. Seventy per cent of the graduates thought courses should be extended beyond four years to give a broader base of the humanities, then more time for delving deeper into engineering specialties. Many favored graduate study, but not thesis writing. Lab reports get too much stress, the replies said.

Some of the courses that were felt to be expendable were advanced math, railroads, geodetic surveys, general chemistry, and advanced surveying.

Civil-Service Positions

The United States Civil Service Commission reports openings for cartographic aids, and engineering, cartographic, and statistical draftsmen in Federal agencies in and around Washington. The salaries range from $2,450 to $3,825 a year.

To qualify, applicants should have from 1 to 5 years of experience, although education may be substituted for all of the required experience in the lower-grade positions and for part of the experience in the higher positions. Applicants for drafting positions must furnish a sample of their work.

Full information and application forms may be secured at most first- and second-class post offices, from civil-service regional offices, or from the U. S. Civil Service Commission, Washington 25, D. C.

"Highway interests are likely to suffer because of the narrow scope of the work that is commonly included under the heading of maintenance. . . . Each year a large mileage of highway reaches the end of its economic life and can no longer be kept in use by a reasonable expenditure of funds. Often a badly worn surface is associated with narrow width, sharp curves, and steep grades wholly unsuited for the present volume and speed of traffic.

"Replacement of such surfaces is just as much maintenance as is the replacement of ballast, ties, and rails on a railroad. Also it is just as important to the country in accomplishing its main objective — war production." — *Senator Dennis Chavez, Chairman, Senate Committee on Public Works.*

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SALESMAN FOR DEMOCRACY

Prestress Technique Tried by California

First Prestressed Bridge West of Mississippi River Built To Carry Pedestrian Traffic Across Arroyo Seco

• TEN miles northeast of the Los Angeles Civic Center, where the Arroyo Seco flood channel meanders alongside the fast Arroyo Seco Parkway, a small construction job is under way. It is small. It's so tiny that most motorists fail to notice it as they zoom past the 60th Street overcrossing. But to bridge builders, that job is one of the most important in their field.

For it marks the first time that a prestressed-concrete bridge has ever been built west of the Mississippi River. It is only a small footbridge, 110 feet long with an 8-foot deck, across Arroyo Seco. Design engineers of the California Division of Highways frankly call it an experimental job, and they make no lavish promises for large-scale future bridges until more design and construction experience is developed on small structures such as this.

As for Contractor Walter Kaucher of Los Angeles, who has the $23,770 construction contract, it's just another job with some super-special headaches. "Work like this calls for special attention to detail. Those girders are going to be under a lot of tension, remember", he explains. "Think of what might happen if they got to whipping while we had them in the air.

"On the other hand, prestressing saves in size and weight of the members. That's an advantage. It saved me a lot of falsework in the channel; in fact, it let us prefab those big girders up in the dry. Good thing, too. During these winter months the County won't let you obstruct the flood-control channel."

An Ideal Project

From the designer's point of view, the Arroyo Seco footbridge was ideal for the prestressing experiment. The area is easily accessible for experimental work. The bridge is a small one, and its live-load design of 55 pounds per square foot is not likely ever to be greatly exceeded.

Too, considerable leeway could be left to the contractor regarding materials and prestressing details. Specifications were anything but dictatorial. Even the size of prestressing wire was left indefinite between the range of 0.1 and 0.3-inch diameter. The specifications excluded no prestressing process. In fact, the designers got plenty of valuable information from Pacific Bridge Co., which is interested in the Mangel (Belgian) method of prestressing. Raymond Concrete Pile Co. supplied valuable infor-

(*Continued on next page*)

C. & E. M. Photo

The first girder pour gets under way on California's prestressed-concrete footbridge across Arroyo Seco, near Los Angeles. The girders were prefabbed in the dry, near the flood channel. Walter Kaucher of Los Angeles is the contractor.

MASTER WORKER!

This versatile T7 TRAXCAVATOR working at a dam site on the Big Thompson diversion project near Loveland, Colorado, hoists its bucket high to load a big hauling unit.

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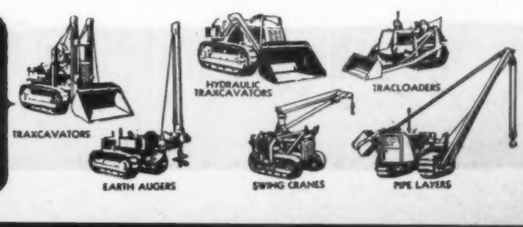

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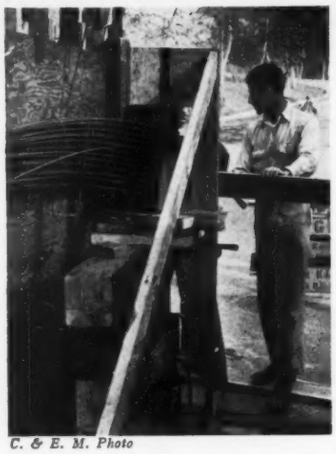

C. & E. M. Photo

Before the concrete forms for the bridge girders are buttoned up, the prestressing wires are threaded through this large stressing block. Contractor Kaucher used a prestressing method patented by Prestressed Concrete Corp.

Prestress Technique Tried by California

(Continued from preceding page)

mation regarding the Freyssinet method.

Unit working stresses were designed on the conservative side, being 1,700 psi for concrete testing 5,000 pounds at 28 days. For the prestressing wires, a minimum ultimate strength of 200,000 psi was specified, with each wire developing 0.6 of the ultimate tensile strength. In other words, wires with an ultimate of 200,000 psi would be worked at 120,000 psi. To allow for shrinkage in the concrete, and creep in both steel and concrete, a final stress of 102,000 psi will be maintained after these forces reduce initial prestress by about 15 per cent.

Girders Prefabricated

Tonnage per girder was considerably lower than if a conventional design had been used. With only a 50-ton lift, instead of 88 tons represented by the conventional design, Kaucher chose to prefabricate the girders on the left bank of Arroyo Seco, up where it was high and dry. Thus the contractor himself was the first man to benefit by the saving in tonnage in the new design.

C. & E. M. Photo

Contractor Walter Kaucher, left, and Resident Engineer Jack Sylvester talk things over as the first girder pour gets under way.

The two girders had been designed to be 10 inches wide, 5 feet 8 inches deep, with a 1-foot 8-inch-wide 9-inch-thick top flange. Each girder will extend 4 feet above the 5-inch walkway slab to serve also as a guardrail.

Kaucher picked a spot on a short paved street near the flood channel to do the prefabricating. The plan of operation consisted of building one girder at one side of the 6 x 6 timber cribbing which was laid out for 110 feet along the street. After the first girder was concreted, the forms would be stripped intact in one piece, and the two halves moved over and reassembled on the other side of the cribbing to build girder No. 2.

Forms consisted basically of oiled plywood facing, nailed to 2 x 4 studs at 12-inch centers. Four sets of double 2 x 4 wales extended longitudinally throughout the form, and every 36 inches a ⅝-inch steel Concrete Equipment Co. tie rod held the forms together.

From a practical standpoint, one of the things that required careful preparation in the forming was the fancy architectural fluting which designers had placed on the upstream face of the bridge. The fluting troughs were only 3/32 inch deep, and the entire fluted section was only 5/8 inch wide. Kaucher knew that if he had lumber cut to this dimension it would likely shrink and cause trouble.

So he made arrangements with a lumber company and a Los Angeles woodworking mill to have the special facing milled from special kiln-dried lumber. So there would be absolutely no possibility of a mistake, he had the fluting milled on dried boards exactly 5 inches wide. The fluting was cut off at the end of each board at the high point of the corrugation, and the boards were tongue-and-grooved. The special care cost slightly more money than haphazard methods, but it paid off several

(Continued on next page)

For Economical Earthmoving

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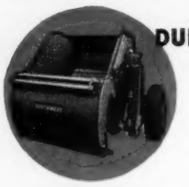
SPREADS

LOADS



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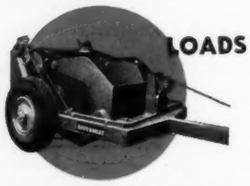

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A lead crane and a tail crane, both working with short booms, would lift

(*Concluded on next page*)

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THE BALANCED LINE

C. & E. M. Photo

Before the concrete forms for the bridge girders are buttoned up, the prestressing wires are threaded through this large stressing block. Contractor Kaucher used a prestressing method patented by Prestressed Concrete Corp.

Prestress Technique Tried by California

(*Continued from preceding page*)

mation regarding the Freyssinet method.

Unit working stresses were designed on the conservative side, being 1,700 psi for concrete testing 5,000 pounds at 28 days. For the prestressing wires, a minimum ultimate strength of 200,000 psi was specified, with each wire developing 0.6 of the ultimate tensile strength. In other words, wires with an ultimate of 200,000 psi would be worked at 120,000 psi. To allow for shrinkage in the concrete, and creep in both steel and concrete, a final stress of 102,000 psi will be maintained after these forces reduce initial prestress by about 15 per cent.

Girders Prefabricated

Tonnage per girder was considerably lower than if a conventional design had been used. With only a 50-ton lift, instead of 88 tons represented by the conventional design, Kaucher chose to prefabricate the girders on the left bank of Arroyo Seco, up where it was high and dry. Thus the contractor himself was the first man to benefit by the saving in tonnage in the new design.

C. & E. M. Photo

Contractor Walter Kaucher, left, and Resident Engineer Jack Sylvester talk things over as the first girder pour gets under way.

The two girders had been designed to be 10 inches wide, 5 feet 8 inches deep, with a 1-foot 8-inch-wide 9-inch-thick top flange. Each girder will extend 4 feet above the 5-inch walkway slab to serve also as a guardrail.

Kaucher picked a spot on a short paved street near the flood channel to do the prefabricating. The plan of operation consisted of building one girder at one side of the 6 x 6 timber cribbing, which was laid out for 110 feet along the street. After the first girder was concreted, the forms would be stripped intact in one piece, and the two halves moved over and reassembled on the other side of the cribbing to build girder No. 2.

Forms consisted basically of oiled plywood facing, nailed to 2 x 4 studs at 12-inch centers. Four sets of double 2 x 4 wales extended longitudinally throughout the form, and every 36 inches a ⅝-inch steel Concrete Equipment Co. tie rod held the forms together.

From a practical standpoint, one of the things that required careful preparation in the forming was the fancy architectural fluting which designers had placed on the upstream face of the bridge. The fluting troughs were only $^{9}/_{32}$ inch deep, and the entire fluted section was only ⅝ inch wide. Kaucher knew that if he had lumber cut to this dimension it would likely shrink and cause trouble.

So he made arrangements with a lumber company and a Los Angeles woodworking mill to have the special facing milled from special kiln-dried lumber. So there would be absolutely no possibility of a mistake, he had the fluting milled on dried boards exactly 5 inches wide. The fluting was cut off at the end of each board at the high point of the corrugation, and the boards were tongue-and-grooved. The special care cost slightly more money than haphazard methods, but it paid off several

(*Continued on next page*)

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Cable or Hydraulic controlled **SOUTHWEST HAULING SCOOPS**

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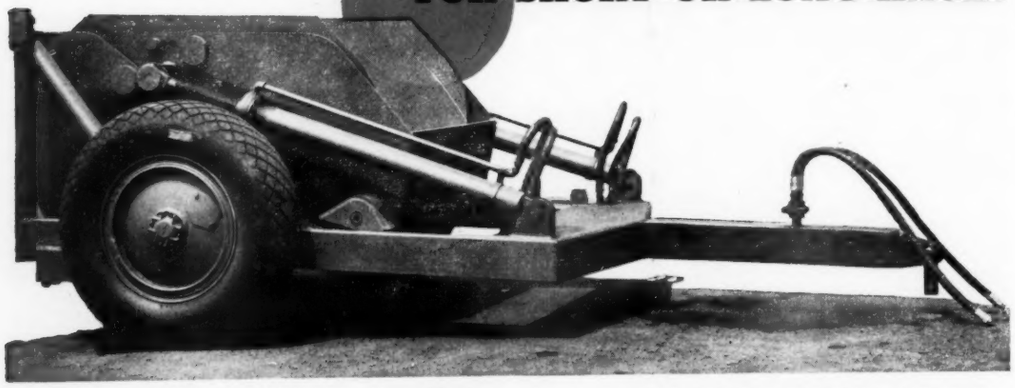

SPREADS

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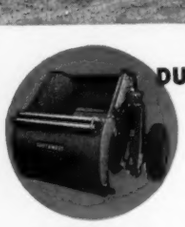

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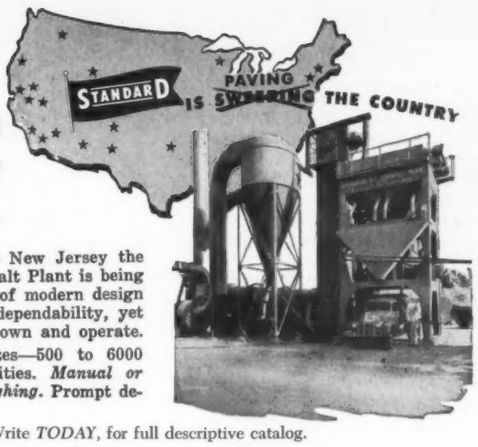

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PORTER-CABLE Speedmatic

THE BALANCED LINE

Prestress Technique Tried by California

(*Continued from preceding page*)

the first girder and carry it, low to the ground, to the south abutment. This girder would be placed on cribbing where it could be picked up later.

The second girder would then be picked up and moved over until its south end rested temporarily on its foundation abutment. Then, while the lead crane held its load, the other machine would hurry down to a position in the Arroyo Seco channel. Hooking on again to the end of the girder, the crane would pick it up and walk it across the channel to its final position on the north abutment. Huge steel eyes had been installed in the ends of the girder for the lift.

Following the installation of the girders, pedestrian ramps were to be completed. Deflections of the bridge, expected to be 0.58 inch under a live load of 55 pounds per square foot, will then be carefully measured by means of the Carlson gages.

Prestressing Advantages Cited

The prestressed-concrete design has several advantages, according to Leonard C. Hollister, Engineer of Design, Bridge Department, of the California Division of Highways. Speaking before the Annual Convention of the Structural Engineers Association of California at Coronado, Hollister told how savings in concrete and steel reinforcement could be made.

Since prestressed structures can be made smaller and slimmer than conventional ones, more beautiful results could be achieved on California's freeways, Hollister believed. One of the headaches of freeway design is a constant fight for headroom where structures span the freeways, and prestressing might solve that problem neatly.

Hollister said also that prestressed bridges might well be built in areas close to labor and materials, and hauled out to the many remote sections where old wooden bridges are located. Many of these structures will soon have to be replaced, and prestressed bridges with their potential saving in weight might be just the answer.

In any event, the results attained on this first prestressed bridge west of the Mississippi will be carefully analyzed to determine what benefits the State might derive in the future.

A Test Embankment Built at Bonny Dam

After two years of laboratory experiments, the Branch of Design and Construction of the Bureau of Reclamation is ready for prototype testing of asphaltic concrete and soil cement as low-cost substitutes for riprap on earth dams.

On March 12 the Northwestern Engineering Co. of Denver, under an $82,890 contract, began construction of a test earth embankment at the Bonny Dam reservoir in eastern Colorado. The embankment will be used to evaluate the durability of asphaltic concrete and soil cement as slope-protecting materials. The site was selected after all factors affecting successful slope protection had been considered. Weather conditions at Bonny reservoir are comparable to those at sites of other dams in the planning stage, and the section will be exposed to freezing and thawing, wind and wave action, reservoir draw-down, and all other severe service conditions.

When completed, the test section will be about 400 feet long and 25 feet high. The methods used in building an earth dam will be followed so that full-scale tests can be carried out. Materials include 46,000 cubic yards of earth fill, 150 tons of asphalt, and 1,700 barrels of cement. A 3-foot-thick soil-cement facing will be placed for 200 feet on the upstream slope; the other 200 feet will be covered with asphaltic concrete in thicknesses varying from 6 to 18 inches.

Bureau engineers expect that data assembled during the tests at Bonny will put them in a position to recommend the cheapest and best possible protection for earth dams. The Bureau is especially interested in these tests since more than 40 earth dams are in the planning stage in the Missouri River Basin.

New Diaphragm Valve To Protect Air Tools

A new line of valves for automatic removal of contaminants and precipitates from compressed-air lines, aftercoolers, sumps, tanks, and air-brake systems has been announced by Wilkerson Corp., 1749 S. Broadway, Denver, Colo. The equipment is said to eliminate manual attention or adjustment, and effect savings in air-tool repair parts and pneumatic-machine replacements. The line features automatic separators and drains.

When the air line is not in use, the diaphragm of the valve is forced down by back pressure causing the O-ring to seal the sump bottom. As air is used, the pressure differential raises the diaphragm and shaft—sealing the bottom of the middle chamber, opening the bottom of the sump, and blasting out contamination.

A catalog on the full line may be obtained from the company. Or use the Request Card bound in at page 16. Circle No. 913.

Rope and Chain Fittings

A revised and enlarged catalog on wire-rope and chain fittings is available from The Thomas Laughlin Co., Portland 6, Maine. The 44-page booklet lists each product and includes specifications, dimensions, prices, working characteristics, and illustrations. Also listed are some industrial and marine hardware products.

This literature may be obtained from the company by requesting Catalog 150, or by using the Request Card at page 16. Circle No. 956.

Sgt. Robert Chrisman levels a field at the eastern end of the Davison airstrip, Ft. Belvoir, Va., with a "Cat" D7 Tractor. In the background are four "Cat" No. 12 Motor Graders completing runway.

THE MILITARY GETS FIRST CALL

THESE "Caterpillar" earthmoving machines, working on the runway of the Davison airstrip at Ft. Belvoir, Va., show at a glance where a lot of "Cat" equipment is going these days. And that's how it's got to be.

Defense Rated Orders get first call as America's military establishment prepares for what may come. The urgent build-up of our power has meant drafting machines as well as men. An ever-increasing flow of "Caterpillar" equipment and parts is going to the support of America's fighting men and to defense projects.

This means that there already exists a scarcity of "Cat" equipment and engines for civilian use. So it is to *your* advantage to make the machines you now have *last*. You can keep them on the job longer by doing these things:

1 Follow sound and recommended operation and maintenance procedures to the letter. Read and reread your Operator's Instruction Book.

2 Make full use of your "Caterpillar" dealer's facilities for servicing and rebuilding machine parts.

3 Anticipate future parts needs, then contact your dealer and let him help. But *don't* buy or order parts you don't actually need.

Caterpillar Tractor Co. will do everything possible to maintain every "Caterpillar" machine in the field, to provide new machines as fast as possible, and to allocate them as fairly as possible.

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New Tamping Machine For Large-Scale Work

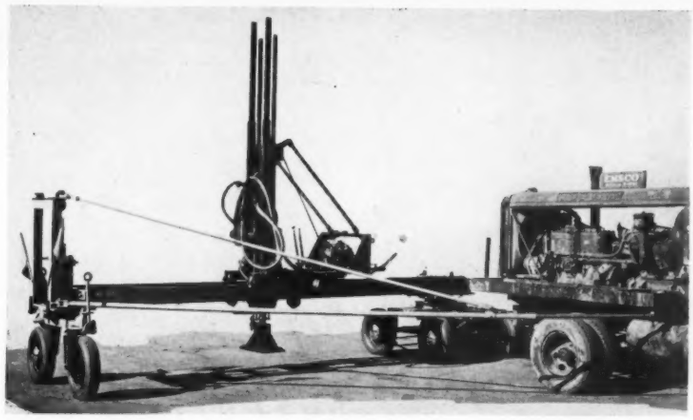
A novel tamping machine has been engineered by R. P. B. Corp., 2751 E. 11th St., Los Angeles 23, Calif. It is designed to do deep wide tamping economically, and at the same time to deliver the impact blow needed in heavy-duty work.

The tamper is set on a platform which is in turn carriage-mounted on a pair of channel framing members. This frame is mounted on two wheel assemblies, the forward one a 4-wheel unit, the rear one a 2-wheel unit. The rear wheels have swivel mountings that enable the entire frame to be turned at right angles to the towing vehicle. Set at right angles to the truck, the 15-foot frame enables tamping to be performed with the unit straddling a wide ditch. The tamper itself has a free vertical run of 15 feet so that it can work far below the ground surface.

Controlled impact permits a range of pressure from a patting action to the full force of the hammer—5,500 pounds. The frequency of blows may be controlled from 6 to 60 per minute. The heavy-duty air motor mounted on the platform propels the carriage and hammer along the frame members. This motor also controls the raising and lowering of the hammer and guide so that the unit can be positioned at any depth ranging from the bottom of a 15-foot trench to the top.

In normal operation on a wide trench, the hammer and supporting frame straddle the trench. In this manner the unit may also be used for tamping canal banks, since the end of the frame which rests on the forward wheels is hinged to allow the two main members of the carriage to be elevated to an angle of 45 degrees. Where the full width of travel is not required, the machine may be collapsed, thereby bringing the outward wheels closer to the towing vehicle. Or, if desired, it may be used in the towing position for tamping backfill in narrow deep ditches such as for sewer lines.

The operator rides on the propelled carriage and controls all movements with two levers. All that is necessary is for the operator to reverse the machine when it comes to the end of the carrying members. The manufacturer points out that the machine is fully automatic and can be instantly set to any blow desired. When the machine has been put in a trailing position for towing, the hammer hinges down, lowering the top of the guides within a few feet of their main frame.



Wide heavy-impact tamping is possible with the new carriage mounted RPB machine. The operator rides on the propelled carriage, manipulating two levers.

Further information on this RPB tamper may be secured from the company. Or use the Request Card at page 16. Circle No. 869.

Double-Helix Earth Auger

A 4-page bulletin describing the Pengo double-helix earth auger—designed for use with the Highway Earth Boring Machine or, on special order, Williams, Buda, International, Jaques, Sterling, or Trackson machines — is available from Petersen Engineering Co., 460 Kifer Road, Santa Clara, Calif. The augers are available in a range of sizes up to 36 inches in diameter. They will bore, the literature says, in any kind of soil, hardpan, decomposed rock, or caliche, and in some sandstones.

The catalog discusses in detail the double-helix design, the live-action fishtail pilot bit, the way the cutting teeth are positioned, and the ease with which augers can be changed. There are additional data on miscellaneous parts and accessories, a complete chart of specifications, and price lists.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 868.

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AVAILABLE IN 3 TYPES

- PARALATERAL—wide strip for vertical joints
- NARROW STRIP—Pressure Seal
- MOLDED STRIP—for keyed construction joints

Premolded Para-Plastic in any of its forms has a high degree of cohesive, adhesive, resilient and plastic properties that assures maximum effectiveness in any type of seal. Bond is maintained at all temperatures from 0° to 180°—regardless of moisture conditions. Economical—easy to handle—fast application—Premolded Para-Plastic is answering joint sealing problems in every type of construction.

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SERVICE to see that they do

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Because — Better materials go into them — Their rubber is extra tough, extra resistant to cuts, scuffs, and snags. The rayon cords in their body structure are Gum-Dipped under tension for enduring strength and stretch resistance.

AND . . . FIRESTONE SERVICE HELPS YOU GET THE *MOST* OUT OF YOUR TIRES—

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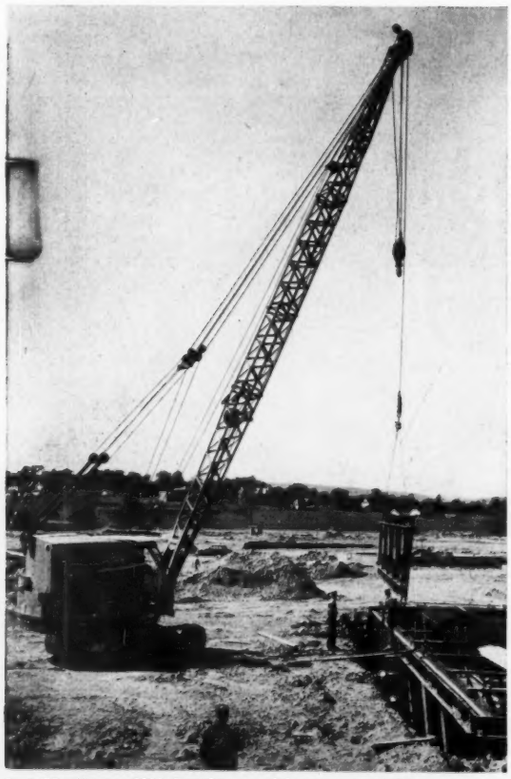
CALL YOUR NEARBY FIRESTONE DEALER OR STORE FOR THE BEST IN TIRES AND TIRE SERVICE

WHEN ORDERING NEW EQUIPMENT SPECIFY
FIRESTONE OFF-THE-HIGHWAY TIRES

1. A Lorain Backdigger excavates a cellar on the Westbrook Village project, loading clay to an Oshkosh 4-wheel-drive 8-yard truck. The hole is 4½ feet deep.

2. Concrete for a column footing 2 feet square x 1 foot deep chutes from a 7-yard Jaeger transit mixer mounted on an Autocar truck.

Steel Forms Speed Housing Foundation



3. A Manitowoc 2000 Speedcrane picks up an outside section of an Irvington steel form for the cellar wall.

Costs Cut on 100-Building Job By Using Concrete-Wall Forms That Are Easily Assembled And Dismantled

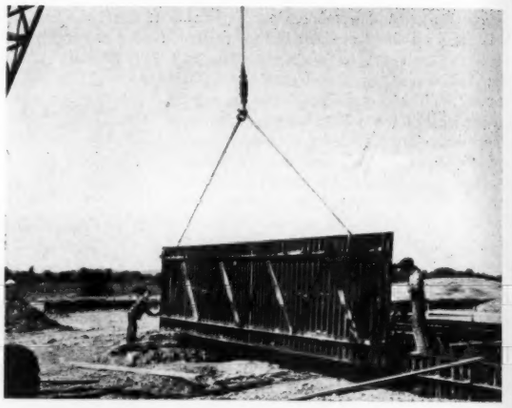
By WILLIAM H. QUIRK
Eastern Editor

• CONCRETE foundation walls were poured quickly and economically for Westbrook Village, a large-scale housing project in Hartford, Conn., with the use of steel forms especially adapted for fast assembly and dismantling. The 100-building moderate-rental development is being built by F. H. McGraw & Co. of Hartford, under a $3,020,000 low-bid contract awarded by the City of Hartford Housing Authority in cooperation with the Connecticut State Housing Authority. Construction started May 16, 1950, and by January, 1951, some of the buildings were ready for occupancy. The entire project is scheduled for completion this summer.

The 100 buildings, two stories high, contain 360 apartments, made up of 88 apartments with 3 rooms, 232 apartments with 4 rooms, and 40 apartments with 5 rooms. Three different sizes of buildings are constructed, either singly or in two-building combinations abutting at the corners. The three sizes are designated A, B, and C units, with the A's measuring 70 feet 0 inches x 25 feet 2 inches; the B's, 39 feet 4 inches x 26 feet 2 inches; and the C's, 56 feet 8

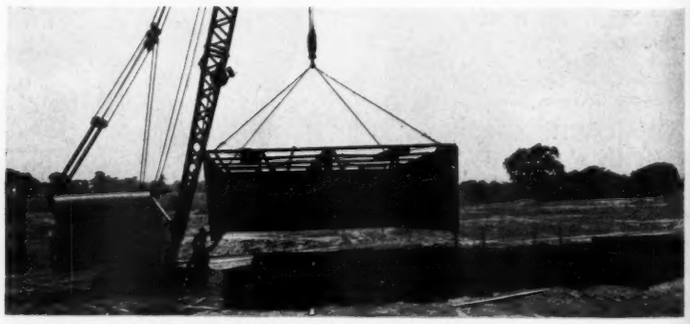
(Continued on next page)

C. & E. M. Photos

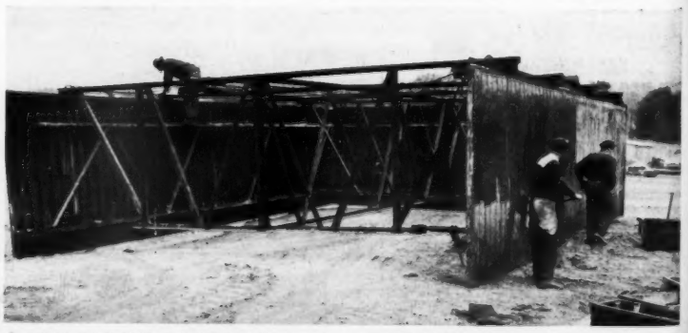


4 and 5. The crane sets the outside form section on the footing (top photo); it is then secured with wall ties.

6. A Smith (left) and a Jaeger truck mixer chute concrete from opposite sides.



7. Inside forms were stripped first—here the inside form for an A-type building.



8 and 9. At left is a finished cellar wall pour with the inside form removed. Above, the form is scraped clean of mortar and oiled for the next pour.

inches x 25 feet 2 inches. There are two A-B units; fifty-six A units; four C units; and eighteen B-C units.

Foundations are poured plain-concrete walls, 12 inches thick, supported on 24-inch concrete footers. A row of Lally columns on concrete footings run lengthwise of each structure supporting an 8-inch I-beam resting at the ends on the cellar walls. The cellar floors are 4-inch concrete slabs. Above the foundation, the wood framing is enclosed by 4-inch brick walls backed by 4-inch cinder blocks that are furred and covered with Celotex lath, followed by plaster.

Favorable Site

The project is laid out on a 3,000 x 1,000-foot plot of ground fronting on Albany Avenue in the northwest section of Hartford. It lies just within the city limits, with the western end bordering the North Branch of the Park River. The tract was once part of the Goodwin estate.

Operations began with the stripping and stockpiling of the topsoil, followed by rough-grading the rolling site. At one time a fleet of 7 tractor-scraper units and 4 tractor-dozers were engaged in the earth-moving.

Included in the general contract with F. H. McGraw & Co. are such items as the installation of storm and sanitary sewers; landscaping; laying gas lines, water mains, and other underground utilities; and paving streets, sidewalks, parking lots, and play areas with asphaltic concrete. Each group of houses has a parking lot and play area.

Following the general excavation, individual cellars were dug with backhoe rigs, ¾-yard or 1-yard size. Total job excavation amounted to 200,000 cubic yards, with the surplus material being put to good use filling in low areas along the river. As many as five backhoe excavators were on the job at one time, along with a dozen dump trucks including some new Oshkosh 4-wheel-drive 8-yard models. The backhoes dug the holes skillfully, practically to precise grade, hand shovels being used only for the final few inches of adjustment. Soil at the site is clay throughout. A complete foundation was dug in a little less than a day.

Wall Footings

At each corner of a building, two batter boards were erected to give line on each side for the wall footings. Trenches were dug out to a depth of 1 foot below cellar grade, and 2 feet wide. At the same time wooden forms were built into the ground for the column footings which are 2 feet square x 1 foot deep. Transit-mix concrete for these pours was chuted directly into the forms from the truck mixers that backed up to the edge of the holes.

All job concrete was supplied by the General Sand & Stone Corp. of Hartford, and delivered from its batch plant 3½ miles away, usually either in Jaeger or Smith 7-yard mixers mounted on Autocar or Sterling trucks. The mix contained 5⅔ bags of cement to the cubic yard, and attained a required strength of 2,500 psi at 28 days.

Great care was exercised to pour the footings to exact grade with a smooth level surface, since they are the base for the wall forms. To bond the non-reinforced footings and walls together, a keyway was constructed down the center of the top of the foundation wall footings. A separate footing was built within the foundation to enclose the

(Continued on next page)

C. & E. M. Photo

Here are two units, nearly completed, of the Westbrook Village housing project which F. H. McGraw & Co. is building in Hartford, Conn., under a $3,020,000 contract. An A-type unit is at the left, a C-type at the right.

THE "Quinn Standard"
FOR CONCRETE PIPE
The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that Quinn pipe forms and Quinn mixing formulas combine to produce the finest concrete pipe at lowest cost.
Quinn Heavy Duty Pipe Forms
For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.
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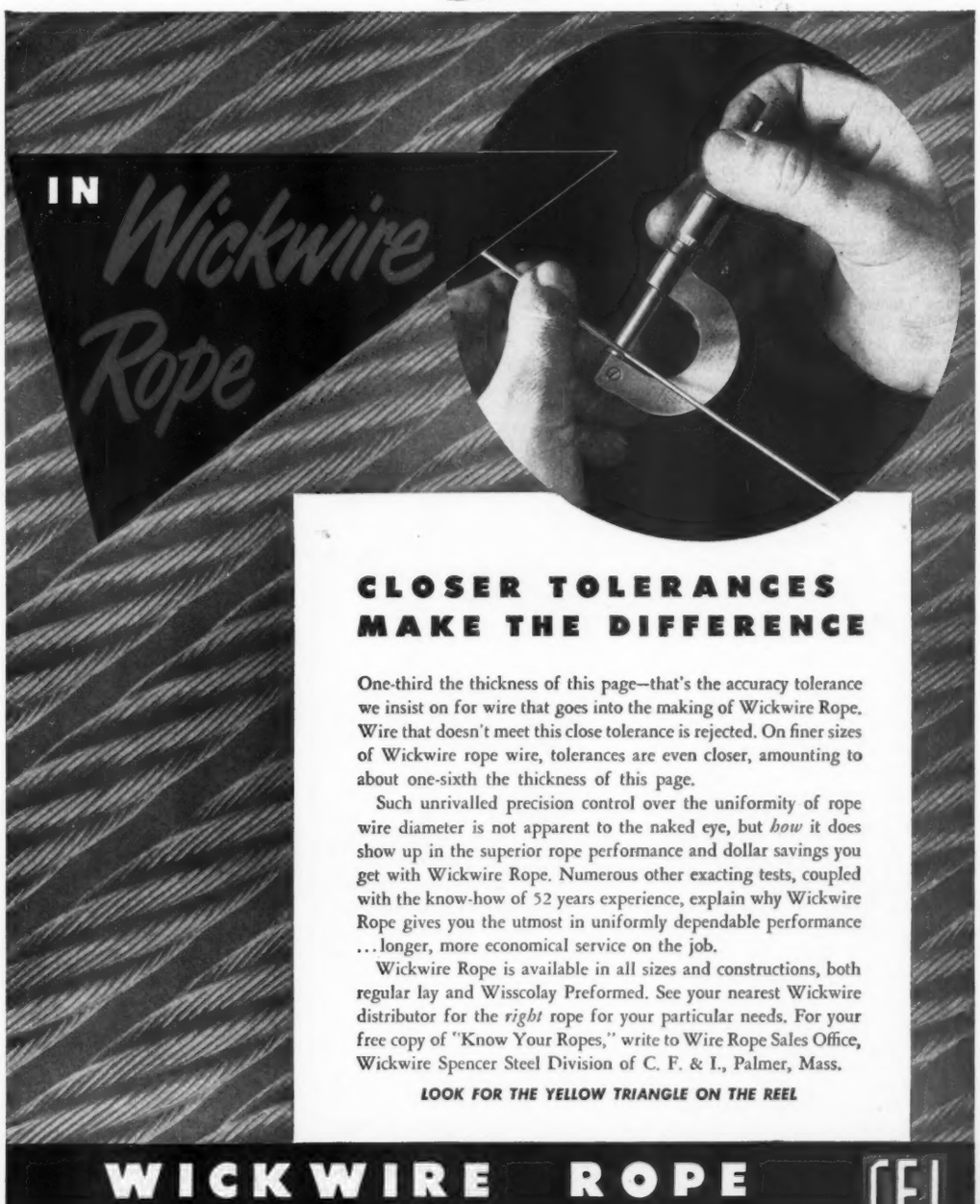
ALL ROPES look ALIKE... but
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CLOSER TOLERANCES MAKE THE DIFFERENCE
One-third the thickness of this page—that's the accuracy tolerance we insist on for wire that goes into the making of Wickwire Rope. Wire that doesn't meet this close tolerance is rejected. On finer sizes of Wickwire rope wire, tolerances are even closer, amounting to about one-sixth the thickness of this page.
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Steel Forms Speed Housing Foundation

(Continued from preceding page)

boiler-room area. Subsoil drainage was taken care of by installing a line of vitrified-clay pipe around each building at foundation level, and backfilling the trench with gravel. Laterals carry the water off to the main sewer lines. The concrete cellar floor slabs are laid on a 6-inch backfill course of gravel.

Steel Forms

All the foundation walls were poured with the use of Irvington steel forms assembled at the site by the contractor, who also added special features to meet job conditions and requirements. The sides of the forms were made up of 6-inch and 8-inch channels running vertically, and bolted together to form panels of the desired lengths. These channel sections were strengthened on the rear face with either channels or angle irons serving as wales or diagonal braces. Two horizontal wales were used, the upper one being 1 foot 3 inches below the top of the form, and the lower wale being 1 foot 3 inches above the bottom of the form.

Forms were 7 feet 10 inches high, which was increased to 8 feet with a 2 x 4 sill. On the inside forms, this sill was fastened to the bottom of the panels. The outer forms were set on the 2 x 4's laid on top of the concrete footings. The forms were constructed to accommodate pours for the standard 7-foot 7-inch wall heights in the project. For type B buildings, smallest of the three sizes of houses, the inside forms were made up into a single unit, while a separate panel section was used for the outer forms on each of the four walls. Inner forms for the larger A and C-type houses were built in two units that fitted together. Outer forms were assembled into one panel for the shorter end sections, but two panels, secured together, were used for the 56-foot 8-inch and 70-foot sides of these longer buildings.

At the start, forms were assembled to make four complete foundation pours—two A's, one B, and one C-type building. The single inner unit for the smaller B building had three trusses for interior bracing, two transverse and one longitudinal. For the larger A and C foundations, each half of the inner form section was braced with one longitudinal and two transverse trusses. The contractor built the trusses on the job, by welding angle irons together. Steamboat-ratchet connections between the ends of the trusses and the form panels permitted adjustments for line.

Handled by Crane

The inside form was always set first and adjusted to the line of the wall by the ratchets. A movement of as much as 3 inches was possible with these connections. The rounded corners, specially built for the inside forms, were lined up and fixed in place. Where the two sections were required in the longer buildings, the connection in the face forms was made with a single channel member on each side, slipped vertically into place and bolted to the adjoining channels. Next, the outside forms were set in place, and secured to the inner panels by ties along the wales. Shoring was also resorted to at open corners for added bracing and support.

Cranes handled the forms to set them in position where they were adjusted and fastened by hand. The rigs doing most of this work were a Manitowoc 2000 Speedcrane with an 80-foot boom, a Link-Belt Speeder, and a Lorain Moto-Crane. As a rule the crawlers picked up the inside forms, and the truck crane took care of the outside forms. Concrete was delivered by truck mixers, sometimes with two units chuting the mix into the forms from opposite sides of the building. As the concrete was placed it was vibrated with Mall vibrators.

C. & E. M. Photo

McGraw's Project Engineer R. C. Oppel and General Superintendedt Bobby Hutchinson are the first two at the left. At right is George Casey, Clerk of the Works for the Hartford Housing Authority.

In removing the forms after a pour, the outside panels were lifted out first. Then the crane pulled the center channel section on the inside form, in the case of the longer buildings, dividing the forms into the original two units. Each half was then lifted out separately. Thus the total number of forms for the larger buildings was eight, while the smaller B buildings required only five—one inner ond four outer form sections.

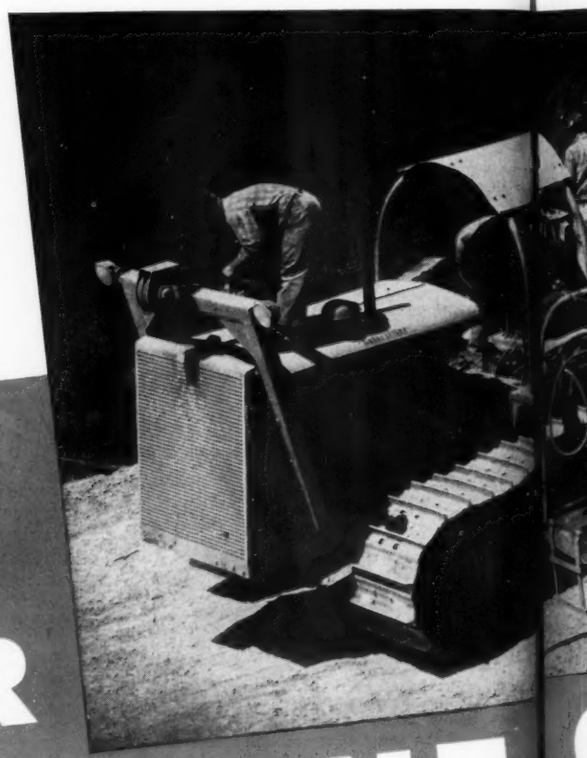
Quick and Economical

Concrete for the project totaled 10,000 cubic yards, and the form area required came to 350,000 square feet. Naturally the steel forms were used over and over again, while if wooden forms were used they would have been unfit for further service after six or seven pours at the most, and would have required constant maintenance. Moreover, steel forms were removed from one pour, moved to a new location, and assembled in place inside of six hours, while the average estimated time to do the same job with wood forms is three days. Labor costs were cut approximately 10 per cent with the use of the steel forms.

After the forms were lifted out of a cellar, any mortar clinging to them was scraped off, and the faces were oiled in preparation for the next pour. Then the

(Concluded on next page, col. 4)

• Contractor's lubrication truck servicing equipment on road-building job in Oregon. Texaco products are used exclusively . . . *Texaco Ursa Oil X*** for engine lubrication, *Texaco Marfak* for chassis lubrication, *Texaco Marfak Heavy Duty* for wheel bearings, *Texaco Track Roll Lubricant,* and others.



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TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. See newspaper for time and station.

TEXACO

TEXACO

Torque Converter Feature of Loader

A new wheel-tractor loader featuring a hydraulic torque-converter drive and a new clutch-type transmission is manufactured by Tractomotive Corp., Deerfield, Ill. It is called the TL-10 Tracto-Loader.

The single-stage torque converter is designed to provide a smooth flow of power to the drive wheels. There is practically no spinning of wheels while loading; crowding action is improved; loading in a higher gear is possible; and there is less wear and tear on clutches and other parts, the company says.

The new clutch-type transmission is said to eliminate most gear shifting. Two multiple-disk clutches are built into the transmission. One is for forward speeds, the other for reverse. Only one clutch is engaged at a time. The operator can go forward or can reverse by pushing or pulling one lever. Reverse speed is almost twice the forward speed. There is a selection of 4 forward and 4 reverse speeds.

A hydraulic torque-converter drive and a clutch-type transmission that eliminates most gear shifting mark the new TL-10 Tracto-Loader.

The TL-10 is mounted on rubber tires, has a ¾-cubic-yard hydraulically controlled bucket, and weighs 10,650 pounds. There is ample bucket clearance and reach, says Tractomotive, to load average-size dump trucks. Power is furnished by an Allis-Chalmers 40.5-bhp gasoline engine. As in other Tracto-Loaders, the bucket is over the drive wheels rather than the steering wheels, to provide positive traction and maneuverability.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 859.

Gates Heads Vermont Dept.

Paul H. Gates of Franklin, Vt., has been named Vermont Commissioner of Highways to succeed F. Richard Bradley of Brattleboro, whose 2-year term recently expired. Mr. Gates was town representative in the 1939 legislature, and town auditor from 1917 to 1934. He is head of Franklin Electric Light Co. and Franklin Telephone Co., and a director of the Lake Electric Corp. of Franklin.

Steel Forms Speed Housing Foundation

(*Continued from preceding page*)

crane picked up the sections again, and "walked" them to the next location. On the inside forms the 4-cable pickup was left attached to the corners to save the time required in hooking up again. The form also served as a handy carriage for lumber that had been stretched across the members for runways and scaffolding during a pour.

As the forms were set and locked in place in the next location, wooden boxes were spotted in position between the walls to make openings for the cellar windows. Above the assembly-built cellar foundations, the upper portions of the buildings were erected in the conventional manner. The wooden framework was speeded by having a modern carpenter shop on the job site, three table saws being used to cut lumber—a DeWalt, Durex, and Wilson.

Radiant Heat

Red-brick walls, requiring approximately 1,500,000 bricks, were laid by the Sibbald Mason Contracting Co., Inc., of Hartford. Door bucks and window sashes are of steel, and ceiling insulation is rock wool. The same material is also placed over the top of the boiler room for insulating purposes. Asphalt-shingle roofing and miscellaneous sheet-metal work was done by the Hartford Roofing & Sheet Metal Co.

Each house has an oil burner to heat the hot water for the radiant-heating system located in the ceiling; copper pipes carrying the hot water are fastened to the joists with brass clips.

Personnel

This is the third large housing project recently constructed in Hartford to ease the serious shortage in moderate-rental apartments.

McGraw personnel on the Westbrook Village construction includes Bobby Hutchinson, Superintendent, and R. C. Oppel, Project Engineer. A force of 250 was employed on the project at the peak of the construction.

The Hartford Housing Authority is represented at Westbrook Village by George Casey, Clerk of the Works. Kane & Fairchild of Hartford is the architect.

New Power Converter Extends Tractor Use

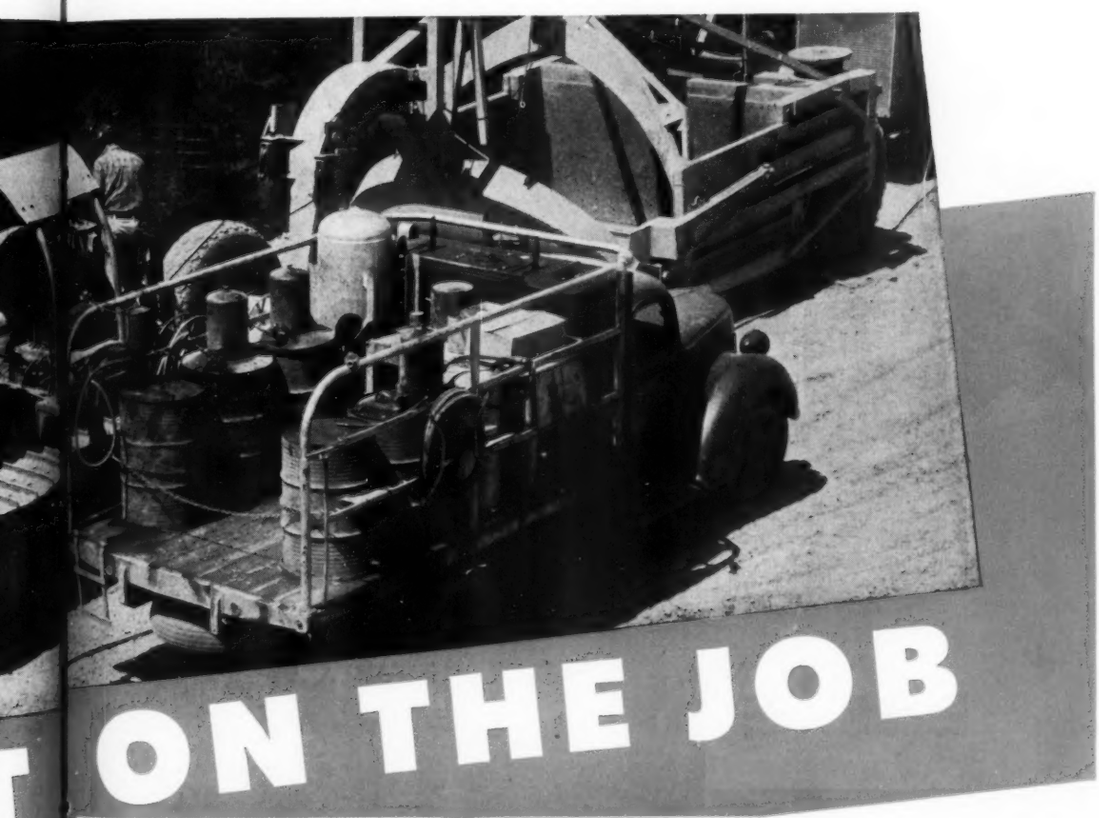
A new power converter designed to extend the power-takeoff shaft of wheel tractors and arrange for operation in a variety of positions, has been developed by B-M-B Co., Inc., 319 New York Ave., Holton, Kans. It enables power-takeoff operation from ground level to a height of 5 feet, and 26 inches to the left or right.

The converter is designed especially for 3-point-hook tractors—such as Ford, Ferguson, Jeep, and Leader—and uses the standard Ford or Ferguson belt pulley. There are attachments for sawing, cutting, and post-hole digging. Circular saw blades range from 32 to 36-inch diameters.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 864.

DeWalt District Manager

Walter H. Roesing, new District Manager for DeWalt Inc., Lancaster, Pa., is in charge of the sale of DeWalt cutting machines and attachments in the New York counties of Westchester, Putnam, and Rockland; the New Jersey counties of Sussex, Passaic, Bergen, and Morris; and all trading areas of Connecticut. Before this appointment Mr. Roesing was the Eastern Sales Representative of American Machine & Foundry Co.



MAINTENANCE costs and fuel consumption both come down when you lubricate engines—Diesel or heavy-duty gasoline—with *Texaco Ursa Oil X***. In addition, you'll get full power . . . more work and less downtime.

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Use These Other Cost-Reducers, Too

To bring down chassis maintenance costs, use *Texaco Marfak*. It's longer lasting—won't jar or squeeze out of bearings. Protects against dirt, rust and wear. *More than 400 million pounds of Marfak have been sold!*

Assure longer wheel-bearing life by lubricating with *Texaco Marfak Heavy Duty*. It stays *in* the bearings, off the brakes. Greater safety—no seasonal change required.

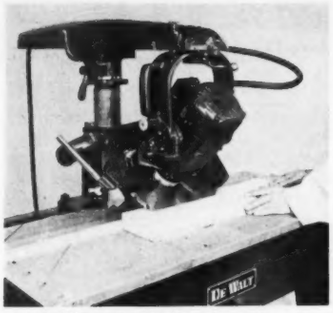
Guard crawler track mechanisms against dirt, water and wear by lubricating with *Texaco Track Roll Lubricant*. Reduces maintenance costs.

Let a Texaco Lubrication Engineer show you how you can reduce costs with Texaco lubricants and the Texaco Simplified Lubrication Plan calling for only six lubricants to handle all major requirements. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT



DeWalt's new radial-arm saw is a receding arm machine with a dead-rise direct-drive motor designed to permit an unusually deep cut.

New Radial-Arm Saw

A new radial-arm saw, a receding-arm machine, has been introduced by DeWalt Inc., Lancaster, Pa. The arm of the Model R-2 rides on 8 grease-packed double-row bearings. Locating latches permit the user to set the tool quickly in any cutting position. The R-2 motors have thermal-overload and manual push-button starting switches. The machine comes in 3 and 5-hp sizes, and DeWalt recommends 12-inch saw blades for the smaller models, and 14-inch for the larger models.

The DeWalt low dead-rise direct-drive motor permits a depth of cut that is about 40 per cent greater than that possible with conventionally designed direct-drive motors, the company claims. The interference of the bottom of the motor has been reduced to permit the arbor to be brought close to the material being cut. The motor is wound with Formex Fiberglas insulation, and provided with grease-sealed bearings that need no lubrication. Alternating-current motors of this model are totally enclosed to prevent explosions, and the universal ac/dc motors feature a protected enclosure.

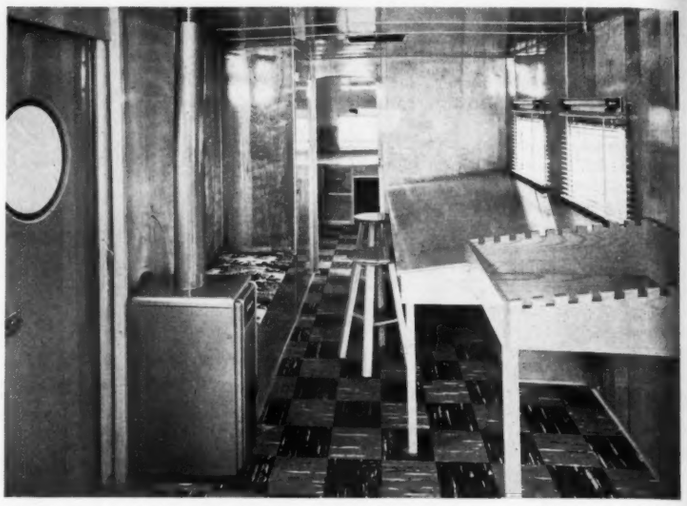
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 860.

Trailer Field Offices

A new line of trailer field offices is on display at Trailer Village Sales, Inc., 8645 Pulaski Highway, Baltimore 21, Md. The largest is 35 feet long, 7 feet 9 inches wide, and 8 feet 10 inches high. All the trailers feature an aluminum exterior, an enclosed chassis, 4-wheel electric brakes, welded steel frame with steel-angle cross members, approved hitch with elevating jacks, regulation tail and clearance lights, and hardwood framing, sills, and studding.

Interior equipment and conveniences offered in the 2-office setup include drafting tables, print-storage racks, cabinets, desks, drawers of several sizes, and a clothes closet. Three ceiling ventilators provide all-weather control. The heating stove and blower are said to bring the offices to comfortable working temperatures even on the coldest days. A number of light fixtures, both fluorescent and incandescent types, and many wall receptacles provide good light on all working areas. Optional features include a washroom with lavatory, hot-water heater, city-water connections, telephone connections to each office, venetian blinds, and inlaid linoleum floor.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 902.



Makes you want to spread right out and get busy, doesn't it — this trailer field office distributed by Trailer Village Sales, Inc., of Baltimore, Md. There is plenty of elbow and storage room and other features of a "stationary" office.

GRACE TRACTOR SWEEPERS

Fit Most Wheel Tractors
Sweep right or left
6' or 8' overall width

GRACE CHIP SPREADERS

For Fast Uniform Coverage
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Macks ARE Masters
OF THE TOUGHEST TERRAIN

No matter how tough the going... under the worst of weather conditions... through slippery mire or shifting sand... or over rutted, uneven ground – big SUPER MACK trucks keep the payloads moving on time... at less cost and with less absenteeism.

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Mack's exclusive Power Divider combines with numerous other outstanding Mack features to give you the power, strength, traction and easy maintenance so necessary for dependable, uninterrupted service on the job. Your nearest Mack branch or distributor will give you complete details. You'll find it's a story worth listening to.

Whether in stripping or excavating, Model LR SUPER MACK trucks keep the loads moving—fast.

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Mack Trucks, Empire State Bldg., New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

Denver USBR Meeting

The progress and the problems of Bureau of Reclamation construction in 17 western states were reviewed when 61 of the Bureau's top construction administrators met at the Denver Federal Center, February 12-16, for the Second Annual Construction Engineers' Conference. The Bureau's Branch of Design and Construction in Denver, under the direction of Chief Engineer L. N. McClellan, sponsored the meeting.

Discussions covered the problems of contract administration, labor regulations, and equipment and machinery installation by contract. Engineering seminars were held on new developments and design, materials, and methods of construction. The conference emphasized ways to speed the production of hydroelectric power needed for the defense effort.

Assistant Commissioner Goodrich W. Lineweaver from the Bureau's Washington office said that USBR activities for the next fiscal year would be keyed to power production because of the national emergency. The fiscal 1952 request for construction, he told the conference, is for $225,000,000, about $100,000,000 less than this year's appropriation. An additional $30,000,000 is being requested for operation, maintenance, general investigations, and general administration.

George Atkinson of San Francisco, President of the Guy F. Atkinson Co., spoke on "Engineer-Contractor Relationships", and analyzed several sources of misunderstanding between engineers and contractors.

Ansbert G. Skina, Chief of the Construction Expediting Branch of the Defense Power Administration, outlined the defense-order situation and discussed material shortages.

Bureau of Reclamation Photo

Grant Bloodgood (center), Chief Construction Engineer of the Bureau of Reclamation, confers with George Atkinson, President of the Guy F. Atkinson Co., San Francisco (left), and A. S. Horner, Vice President of the AGC, during a recess at the Denver USBR conference. Atkinson was a program speaker.

Data on Concrete Curing

A 4-page bulletin on Hunt Process-Clear, a transparent membrane for concrete curing, has been prepared by The Carters-Waters Corp., 2440 Pennway, Kansas City 8, Mo. It outlines general methods of concrete curing, and tells what Process-Clear is, where it can be used, how it is applied, how much is needed, and what special precautions to take in hot and cold-weather work.

Hunt Process-Clear, the literature points out, is a carefully proportioned blend of oils and waxes in a petroleum solvent, which seals and adheres to a concrete surface without permanently affecting the natural color. It is said to dry rapidly and form a film of uniform texture free from pinholes. A quick-fading dye is added for visibility only. The membrane may be applied by a simple pressure spray outfit, either hand or power-operated.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 870.

New Pipe Fittings

A new line of malleable fittings for grooved pipe, including L's, T's, adapter nipples, crosses, laterals, bull plugs, and reducers, is announced by Gustin-Bacon Mfg. Co., 1412 W. 12th St., Kansas City, Mo.

The new Gruvagrip fittings come in sizes ¾ inch to 12 inches and withstand the same working pressures as Gruvagrip pipe couplings used in waterworks and sewage-disposal plants, construction, and mining. Inside walls of the fittings are true circles, smooth and gently curved to prevent turbulence and frictional losses. Wear is distributed evenly over the entire inner wall because it is free of ridges and pockets, the manufacturer says.

The fittings can be removed from the line without disturbing the rest of the piping system. Each fitting bears a permanent identification mark, and comes painted with a prime coat that contains two types of rust inhibitors.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 938.

FOR MORE ON **LORAINS** TURN THE PAGE

Regardless of what size Oliver Industrial Wheel Tractor and Ware Loader you buy . . . "66", "77", "88" . . . you get the identical superior design and performance features in each.

The smaller tractor-loaders are not built down to a price level . . . they are built up to the same quality standards as the larger models.

In the tractors, you get the famous Oliver *plus* power and easy maneuverability that get you in and out of the rough spots . . . *fast!*

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Your Oliver Industrial Distributor will be happy to show you what the "more than a family resemblance" in Oliver-Ware Tractor Loaders means to you in lower cost operation. And see the Oliver color film "Task Force on Wheels."

THE **OLIVER** CORPORATION

Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio

A complete line of industrial wheel and crawler tractors

A Streamlined Dipper

A new hoe dipper with a long, streamlined, curved back designed to cut down drag and heeling action has been developed by Electric Steel Foundry Co., 2141 N. W. 25th Ave., Portland 10, Oreg. The heel of the Fastback dipper has been practically eliminated. Its cutting edge does the digging, leaving clearance for the rest of the bucket through the arc of its pass, the company says. The tooth holders are integrally cast in a long projected lip.

Six widths of side cutters, available for each dipper size, are interchangeable on ¼ to 2½-yard dippers. All parts are designed for resistance to shock and abrasion, Esco says.

Further information may be secured from the company by requesting Bulletin 177. Or use the Request Card at page 16. Circle No. 931.

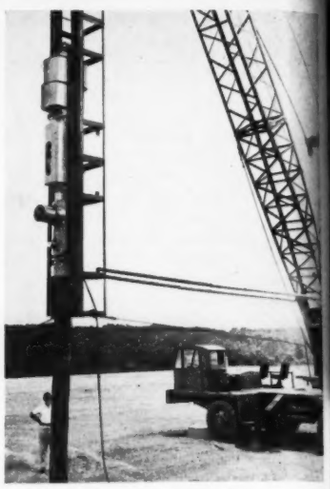
The Fastback hoe dipper is built to cut down drag and heeling action.

Multi-Use Tractor Loader

A circular on the Shoveloader, a multi-purpose tractor tool, is available from the Lull Mfg. Co., 3612 E. 44th St., Minneapolis 6, Minn. It contains 18 questions to be asked when buying a loader—and answers them by describing Lull features. It also lists 63 Shoveloader features.

The Lull machines come in three basic models with a recommended working capacity of 2,500, 4,000, and 6,000 pounds. Attachments include material buckets, pavement-ripper buckets, concrete buckets, bulldozer, and lifting crane.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 896.



Syntron's No. 1417 diesel pile hammer can deliver 16,000 foot-pounds of driving energy a stroke and 35 strokes a minute. It's a self-contained unit.

New Self-Contained Diesel Pile Hammer

A self-contained diesel pile hammer which needs no auxiliary equipment to maintain pressure has been placed on the market by Syntron Co., 227 Lexington Ave., Homer City, Pa. It is 15 feet 6 inches long, has a 20-inch diameter, and weighs 11,000 pounds. It delivers driving energy at the rate of 16,000 foot-pounds per stroke, and is said to be capable of 85 strokes per minute. The weight of the ram or the striking part is 5,400 pounds. Maximum power stroke is 4 feet.

The one-man-operated hammer fits in standard 20-inch leads, can be handled by a gasoline or diesel-operated crane as pictured, and requires two lines—one for lifting the hammer; the other for lifting the pile and for starting the hammer by lifting its piston. The force of each blow is remotely controlled by a hydraulic system which operates like automotive hydraulic brakes. The force can be varied from zero to full power, and the unit will idle without impact and without stalling, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 877.

Rotary Masonry Drills

A pocket-sized circular describing rotary masonry drills is available from Termite Drills, Inc., 2082 Foothill Blvd., Pasadena 8, Calif. The drills come in two styles: the concrete Termites for drilling holes from ¼ to 11/16 inch in diameter, and the core Termites for drilling holes from ¾ inch to 5 inches in diameter. Drills in lengths up to 36 inches are available for hole diameters less than ¾ inch.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 923.

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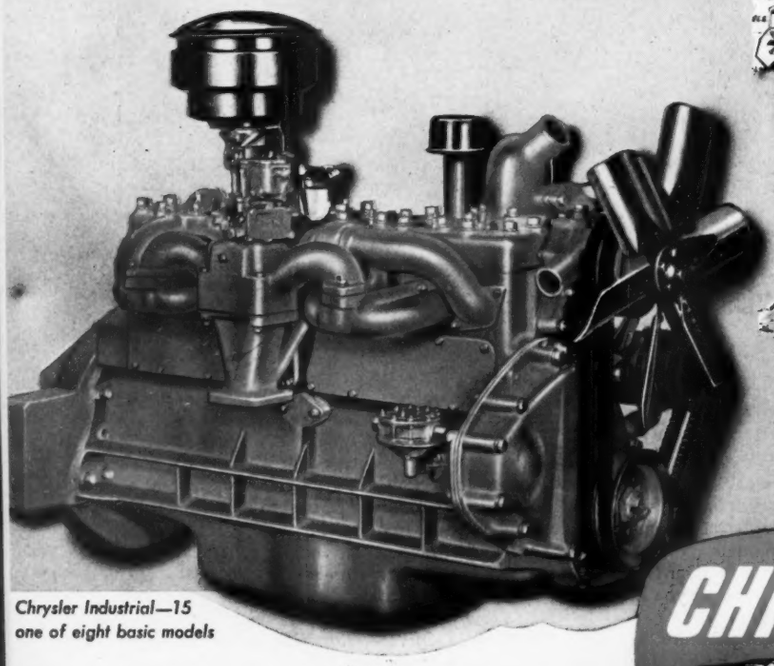
Chrysler Industrial Engines give Better Performance at Lower Cost!



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ARBA Meet Keynoted By World Situation

Delegates Frankly Worried About Road Building if War Trends Continue to Slow Output of Critical Items

• AMERICA'S highways are in danger, and road builders will be lucky to maintain them at present standards if the international tension long continues.

That was the consensus of 650 road-building, materials, equipment, and other construction delegates as the 48th Annual Meeting and National Defense Conference of the American Road Builders' Association gathered in Milwaukee, March 12-14, 1951. Scarcely a note of optimism was heard as speakers described the effect of the tense international situation on America's highways.

One indication of the general feeling of pessimism was the tentative postponement of the ARBA's Road Show, possibly until 1953 or later. Materials shortages, equipment allocations, and the ever-increasing traffic upon the nation's obsolete highway system were described.

In his annual Presidential Report to ARBA, President Enoch R. Needles still called for "more and better roads", but in the same report he charged a lack of unified effort to get them built. Motor manufacturers, the rubber producers, the oil interests, the truckers, and all others who have a stake in serving the public with better highways should join in a concerted public-relations effort, Needles said, so the general public would understand what is happening to the nation's roads.

Needles also pinpointed the general deterioration of the highway system by saying that there are Model T highways, just as there were Model T automobiles. Examining the effect of heavy trucks upon roads, Needles said, "The heavy truck does destroy our light highways, and it does nobody any real good for the truckers to point out that the highways were not built right in the first place. Of course they were not built right, but they are what we have, they cost billions of dollars, and they must not be destroyed until they can be replaced or improved. For the present, reasonable control of truck loads and axle loads is the only answer."

A. C. Clark, Deputy Commissioner of the Construction and Maintenance Division, Bureau of Public Roads, said that somehow new construction must continue on highways if the transportation system is to serve during the international emergency.

Wasteful maintenance of highways which have outlived their usefulness, instead of rebuilding them to do their part in the national emergency, is like a severely injured patient resorting to pain-killing drugs instead of undergoing necessary though costly surgery, Clark warned.

"The patient is ultimately bound to collapse completely under such treatment", Clark said. "Moreover, it is foolish, and perhaps criminally negligent for the doctor—in this case the American people—merely to treat superficial cuts and bruises and ignore the major ailment on the ground that it would be difficult and expensive to treat."

Motor Graders Scarce

Motor graders are the first among construction equipment items to become scarce. So said H. A. Radzikowski, Chief, Maintenance Branch, Bureau of Public Roads. At the present rate of manufacture, Radzikowski said, there will be a shortage of about 3,000 motor graders per year if civilian and armed forces' needs are accurate.

Manufacturers in attendance at Milwaukee said that delivery dates were beginning to lag, in some cases as much as 8 months. But the one bright spot is the possibility of increased production as new steel-making facilities begin to come in. Until that time, equipment can be expected to become scarcer as the months go by, said manufacturers.

Chavez Speaks for Construction

Intelligent Federal leadership for

(Continued on next page)

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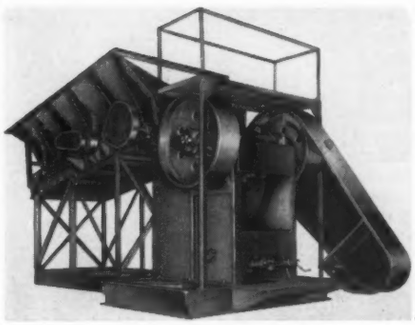
BETTER ROCK PRODUCTS BY BALANCED STAGE REDUCTION CIRCUITS

32" x 40" JAW CRUSHER with 40" x 12' Heavy Duty APRON FEEDER



This heavy-duty team provides a smooth flow to your plant with great efficiency. It saves drilling, saves powder . . . . secondary shooting is reduced to a minimum, and it saves man-power. Available in all primary sizes.

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...and got *these* Features

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ARBA Meet Keynoted By World Situation

(*Continued from preceding page*)

"defense measures that will not permit highway transportation to deteriorate in any degree" was called for by Senator Dennis Chavez (Dem., N. Mex.), Chairman of the Senate Committee on Public Works.

"I do not consider it intelligent preparation for defense to permit highway transportation to deteriorate in any degree", the New Mexico Senator said. Highways are the assembly lines for a large portion of our defense plants, because raw materials move over the roads, and in many other respects highway transportation plays a major part in war manufacturing, Chavez said. Moreover, highway transportation must continue if war workers and the rest of our population are to be fed, housed, and clothed.

Therefore, Chavez reasoned, "I think that when defense and certain civilian needs in other fields are determined in Washington, that share which might be used in roads should be under the direction of the Bureau of Public Roads. Commissioner Thomas H. MacDonald could set up criteria and the states then could plan with a solid program and a real knowledge."

Chavez drew a fine line between new highway construction and maintenance, and said that most major maintenance-betterment jobs called for new construction of some kind. Stringent restrictions on new construction should not be applied, he warned, or the highway system will suffer.

About steel and aluminum, Senator Chavez had this to say:

"Right now, our production is being stepped up greatly. In the meantime, national defense production is grabbing a big cut of present output. I firmly believe that in another 12 months we will reach a balance on steel and several other items. That means more will be available for civilian needs than now. In two years, at the present stage of defense preparedness, and in view of the ceilings placed on military personnel and equipment, our increased production will not only carry the defense equipment, but also come back to near-present-day levels on materials."

Photogrammetric Results Told

How aerial reconnaissance and photographs are doing a public-relations job and making highway location easier was told by R. Getty Browning, Chief Locating Engineer, North Carolina State Highway and Public Works Commission, as he addressed the General Technical Session of the meeting. Actual ground surveys require from 25 to 30 per cent less time, and are much cheaper, due to the immense advantage of being able to make and check all projections well in advance of actual survey operations, Browning said. Enough money could be saved by aerial mapping, he said, in the cost of grading, drainage, and right-of-way acquisition to pay for the survey work.

Browning detailed how his department drafts the cooperation of Mother Nature by having the photography done when the foliage is off the trees and when atmospheric conditions are most favorable. North Carolina uses aerial photos and contour maps to examine large areas of terrain in greater detail and with much more accuracy than would be possible by ground reconnaissance alone.

He described in some detail how one 54-mile and one 75-mile project had recently been located through mountainous terrain in his state with the help of aerial-photographic contracts. Lockwood, Kesler & Bartlett of Great Neck, N. Y., and Aero Service Corp. of Philadelphia were the two contractors whose preliminary work made final location a matter of speed, precision, and the utmost desirability.

Preliminary results from the use of rubber in asphalt pavements was the subject of a paper by Fred Burggraf, Associate Director, Highway Research Board, who described the results of the recent concrete-pavement loading tests conducted in Maryland. Weight increase of 40 per cent in truck loading, from 32,000 to 44,800 pounds, caused 11 times as much cracking in the test pavement, Burggraf said.

In tests of lighter loads, trucks loaded at 22,400 pounds, or 24.4 per cent higher than 18,000-pound loads, caused approximately six times as much cracking, he said. The heavier loads were distributed on tandem axles, while the two lighter categories were made up of single-axle loads, Burggraf said, as he described in detail the tests conducted over a period of several months near LaPlata, Md.

New Officers

Thirteen officers and directors were elected to lead America's oldest national good-roads association, as results of a letter ballot were announced.

Paul B. Reinhold, President, Atlas Equipment Corp., Pittsburgh, was elected President of ARBA to succeed Col. Enoch R. Needles, New York consulting engineer.

Serving with Mr. Reinhold as district vice presidents will be: Northeastern — Charles M. Noble, Chief Engineer, New Jersey Turnpike Au-

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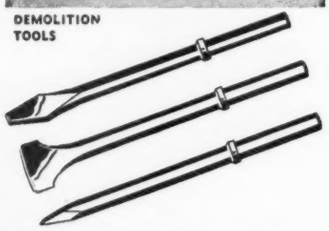

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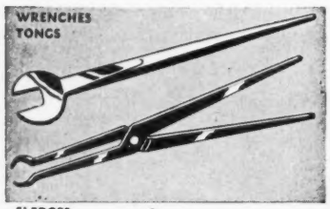

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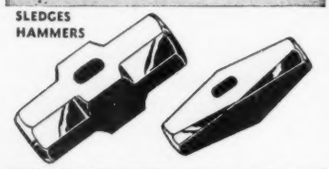

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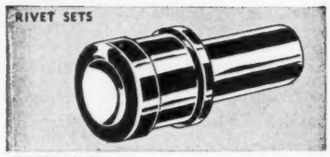

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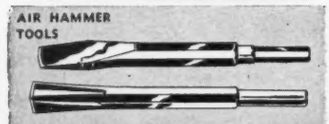
AIR HAMMER TOOLS



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ROSCO MAINTENANCE UNIT

For repair and secondary construction. Both truck and trailer mounted units are available.

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thority; Southern—Charles W. Smith, President, Smith Engineering & Construction Co., Pensacola, Fla.; Central—W. A. Roberts, President, Allis-Chalmers Mfg. Co., Milwaukee; and Western—A. Diefendorf, Head, Department of Civil Engineering, University of Utah, Salt Lake City. Jennings Randolph, Assistant to the President of Capital Airlines, Inc., Washington, D. C., and former West Virginia Congressman, was renamed Treasurer.

Seven directors were also elected: Edgar J. Buttenheim, President, CONTRACTORS AND ENGINEERS MONTHLY, New York City; J. N. Robertson, Director of Highways, Washington, D. C.; Raleigh W. Gamble, Superintendent, Bureau of Street Construction and Repair, Milwaukee; Otto S. Hess, Engineer-Manager, Kent County Road Commission, Grand Rapids, Mich.; Howard L. Way, Highway Commissioner, San Bernardino County, Calif.; A. E. O'Brien, Executive Secretary, Associated Pennsylvania Contractors, Harrisburg, Pa.; and Murray D. Shaffer, General Sales Manager, Buffalo-Springfield Roller Co., Springfield, Ohio.

In the Contractors' Division, the following officers were named: President—Joseph D. Bonness, President, Joseph D. Bonness, Inc., Milwaukee; Vice President—S. Howard Brown, Brown, Davis & White, Lebanon, Pa.

In the County and Local Roads Division, A. J. Thelen, Executive Secretary, Wisconsin County Boards Association, Madison, Wis., was elected President. Serving with him as district vice presidents will be: Northeastern—Julius Kaestner, Jr., President, New York State County Highway Superintendents' Association, Voorheesville, N. Y.; Southern—T. H. Edwards, County Engineer, Montgomery County Board of Revenue, Montgomery, Ala.; Central—A. O. Cuthbert, Engineer-Director, County Road Association of Michigan, Lansing, Mich; and Western—C. E. Brashears, Road Engineer, Yakima County, Yakima, Wash.

The Municipal Division's officer slate is headed by President Warren A. Coolidge, Director of Public Works, Nashville, Tenn. The four district vice presidents are: Northeastern—H. F. Clemmer, District of Columbia Engineer of Materials, Washington, D. C.; Southern—A. G. Wyler, Engineer, Department of Public Property, New Orleans, La.; Central—C. E. Brokaw, Superintendent, Highway Maintenance, Cincinnati, Ohio; and Western—Ralph G. Wadsworth, City Engineer, San Francisco, Calif.

ARBA's Manufacturers' Division, the Construction Industry Manufacturers Association, elected the following officers and directors: President—Julien R. Steelman, Vice President, Koehring Co., Milwaukee; First Vice President—H. T. Reishus, General Manager, Industrial Division, International Harvester Co., Melrose Park, Ill.; Second Vice President—C. F. Boyd, Vice President, Galion Iron Works & Mfg. Co., Galion, Ohio; Secretary-Treasurer—R. E. McCluskey, Vice President, R. G. LeTourneau, Inc., Peoria, Ill.; Executive Vice President—Harold F. Hess, Chicago.

CIMA directors elected for 3-year terms are E. Scranton Gillette, President, Gillette Publishing Co., Chicago; Joseph F. Heil, President, The Heil Co., Milwaukee; C. J. Haring, General Sales Manager, J. D. Adams Mfg. Co., Indianapolis; O. J. Neslage, Vice President, Joy Mfg. Co., Pittsburgh; L. G. Schraub, Vice President, Union Wire Rope Corp., Kansas City, Mo.; and Messrs. Reishus and McCluskey.

Houston, Texas, was selected as the site for the 1952 meeting, which at present is scheduled as a conventional meeting without the Road Show.

C. & E. M. Photo

Left to right: ARBA Southern District Vice President Charles W. Smith, President of Smith Engineering & Construction Co.; Edgar J. Buttenheim, President of CONTRACTORS AND ENGINEERS MONTHLY; ARBA President Paul B. Reinhold, President of Atlas Equipment Corp.; Lt. General Eugene Reybold, Executive Vice President, ARBA.

Shovel Co. V. P. Dies

A. P. Ross, Vice President of Michigan Power Shovel Co., Benton Harbor, Mich., died on March 30.

Speed and economy are more important than ever in these uncertain times. That's why Robt. E. McKee General Contractor, Inc., is using 8 Whiteman Power Buggies to pour 51,000 yards of concrete and rocklite on the big Statler Hotel project in Los Angeles. One Power Buggy does the work of six men with wheelbarrows . . . speeds concrete, sand, brick or mortar over soft earth, up 25% grades, to upper floors, over light scaffolds, through doorways. Carries 12 cu. ft. or 2,000 lbs., yet weighs only 692 lbs. Positive "in-gear" control permits partial or full dumping and return. Travels up to 16 mph. Powered by 7.5 hp, 4-cycle, air cooled engine, has automatic clutch and speed changer. Dependable performance and durability proved over many years. Priced to pay for itself in a short time. Send coupon now for details and name of your nearby distributor.

Climbs 25% grades with ease.

Positive "in-gear" mechanism of dump and return.

Also available with dumping stake-type body.

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Improved Trencher Has Forced Ejection

Improvements in the Oliver-Ware Hydro-Trencher have been announced by the Oliver Corp., 400 W. Madison St., Chicago 6, Ill. Increased reach of 16 feet makes it possible to dig to a depth of 8 to 10 feet and load to a height of 5 feet 6 inches with the standard trencher bucket, the manufacturer says. A single 5-inch boom hydraulic cylinder, double 4-inch dipper-stick hydraulic cylinders, and an improved dipper stick make it possible to "push" on the large diameter of the dipper-stick cylinders, both in trenching and swing loading. The new ram permits a faster swing, Oliver reports. An independent, double-acting ram opens and closes the bucket discharge gate. A hydraulic accumulator which reduces vibration is now standard equipment.

According to the manufacturer, the outstanding feature of the new model is the "forced ejection" bucket, which is available as optional equipment and can be used for both trenching and swing loading. Reversing the bucket and dipper stick converts it to a swing loader. The bucket does not have controlled pitch; instead, the control cylinder is used to force the bucket gate hydraulically all the way through the bucket itself, thus forcing out all material, even clay, gumbo, or sticky soil, the company says. The new Hydro-Trencher has an improved counterweight design with a weight increase of approximately 2,000 pounds.

Standard features include independent hydraulic outriggers for leveling, holding the tractor in place, and relieving it of unnecessary strain; hydraulic rams above the boom for handling large rocks without damaging cylinders; 200-degree swing from the operator's seat; hydraulically controlled pitch on the standard trencher bucket; and hydraulic gates on the standard loader bucket.

The Oliver-Ware Hydro-Trencher is available for mounting exclusively on Oliver wheel tractors, Models 77 or 88.

Further information may be secured from the company. Or use the Request Card at page 16. Circle 990.

Small 100-Watt Lamp For Rugged Service

A 100-watt rough-service lamp that fits standard wire-guard extension-cord equipment is available from Westinghouse Electric Corp., Lamp Division, Bloomfield, N. J. It is particularly adaptable to use on after-dark construction projects, Westinghouse says.

It emits more light than the former A-23 bulb, from a smaller, more breakage-resistant bulb. It is 2⅝ inches in diameter—¼ inch less than the former A-23 bulb. With a maximum length of 5 5/16 inches from top of bulb to bottom of base, it is ¾ inch shorter than the A-23. Its range is from 115 to 300 volts, and it has corresponding approximate average initial lumens of 1,210 to 750. All ratings are designed for a life of 1,000 hours. The lamps are made in clear or inside-frosted glass.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 879.

Consolidated M & S Expands

Consolidated Machinery & Supply Co., Ltd., has expanded its manufacturing facilities at 2031 Santa Fe Ave., Los Angeles, by adding a new building with 18,000 square feet of floor space to house the final assembly line for its Comet woodworking and metal-cutting saws. This $65,000 brick building was designed by Consolidated's engineering staff. Donald F. Shaw & Associates was the general contractor, and Buck & Sumerbell designed and installed the roof structure.

Increased reach and faster swing mark the improved Oliver-Ware Hydro-Trencher. A "forced-ejection" bucket for both trenching and swing loading is optional.

Paints Right Over Rust

A new brochure describing the use of Rustorize, a system of protective painting over rusty metal surfaces without sandblasting or other rust-removing methods, is available from Rustorize Division, McCormack-Medl Corp., Box 221, Bristol, Pa. The brochure covers the problems of painting over rusty steel, tinplate, galvanized iron, and aluminum.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 942.

Curran Forms Gunk Atlantic

A new company, Gunk Atlantic, Inc., S. Canal St., Lawrence, Mass., has been licensed by The Curran Corp. to manufacture and market its Gunk self-emulsifying and self-scouring solvents throughout eastern United States. A. F. Curran, who developed the Gunk solvents, will be associated with the new company.

These labor-saving JAEGER tools do W

Up to 12" thickness in widths to 11', lesser thicknesses to 12'6"

Lay bigger tonnage, accurately, with low cost Paver-Type Aggregate Spreader

Costs half the price of bituminous pavers. Efficiently lays bigger tonnages of base and surface aggregates, free-flowing hot or cold bituminous mixtures or plant-mixed stabilized soil. Crawler or 4-wheel drive operates on subgrade, not on newly-laid material. Straightedge runners insure accuracy of strike-off for highway, street and airport base and both base and top of secondary roads, parking areas and drives. Two models, to work with any size trucks. Ask for Catalog SPS-1.

Big savings to small contractors paving parking lots and drives.

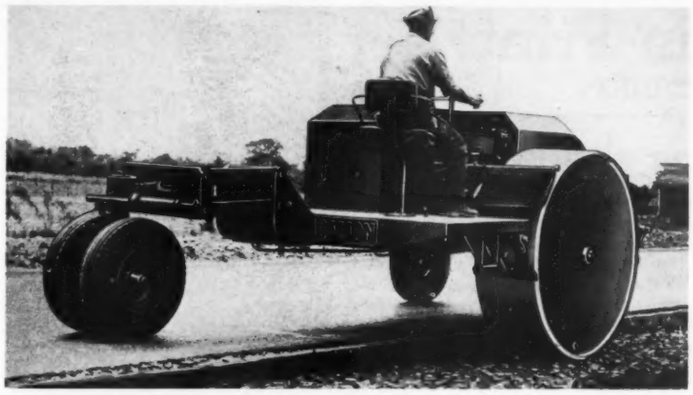
For precision paving with all types of bituminous material, Jaeger improved Model BP-5

The only bituminous paver that (1) operates entirely on the subgrade or compacted course (2) continuously "averages out" subgrade irregularities by means of straightedge runners, (3) automatically matches adjacent course, curb or other grade line, (4) works mat to any uniform desired density with fast-oscillating tiltable screeds, (5) adjusts for 9′ to 12½′ widths with the twirl of a wheel, (6) can lay flush to curbs or headers. Ask for Catalog BP-0.

New Trench Roller Permits Close Work

A new trench roller has been brought out by The Galion Iron Works & Mfg. Co., Galion, Ohio. It features a hydraulic mechanism for operating the dual steering wheels which ride on the pavement, hydraulically controlled leveling wheels, and an extra-large diameter variable-weight compression roll.

The manufacturer states that adjustments are provided to level the roller quickly to suit any trench requirements. The frame has sufficient clearance to enable work in 25-inch depths. Hydraulic control, through the use of a single lever, keeps the machine on a level or horizontal plane from 6 inches above to 25 inches below the road surface. The large diameter of the compression roll is said to eliminate "shoving" of the material being compacted. Compacting effort varies from 310 pounds per inch with the roll empty to a maximum of 370 pounds with the roll ballasted. The compression roll is equipped with front and rear tension scrapers, and mats for moistening the roll when compacting finish materials.



Hydraulic steering for the drive wheels, hydraulically controlled leveling wheels, and an extra-large-diameter variable-weight compression roll feature Galion's latest trench roller. Compaction varies from 310 to 370 pounds per inch.

Other features are a 4-cylinder gasoline engine completely enclosed under the housing; a constant-mesh transmission; a twin-disk clutch; a foot brake; a spur-gear final drive; and an adjustable operator's seat to give unobstructed visibility.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 906.

New Batching Units Handle Bulk Cement

A new line of bulk-cement equipment, embodying all-welded weathertight steel bins, weigh batchers, recirculation systems, and accessories, has been announced by L. K. Lippert Co., 212 First St., London, Ohio. The bins are available in capacities of 195, 285, 375, and 465 barrels. Recirculation systems permit combined capacities upward to 930 barrels.

The bins are rectangular, 10 feet 8 inches x 8 feet 8 inches, and have a full-bin signal, hatch, ventilator, air jets in the cone, emergency cutoff gates, a ladder inside and outside, and rotary valves. The minimum 50-degree cone slopes are designed to provide free flow under all conditions. Constructed within haulage load limitations, the bins are assembled before shipment, thereby saving cost in erection. All bins have legging with ample sway bracing.

Vertical enclosed elevators are provided for either truck or railroad intakes. The elevators have 14-inch buckets and a capacity in excess of 250 barrels per hour. Electric power is standard but gasoline power may be substituted. Horizontal screw transfer equipment is also available for concrete-products plants. Weigh batchers are the beam-scale type with an "over-under" indicator, overweight door, canvas, and cement valve. A telescoping chute may be had on the valve, when desired.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 866.

Spex for Structural Glued Laminated Lumber

Copies of "Standard Specifications for the Design and Fabrication of Structural Glued Laminated Lumber" are available from the West Coast Lumbermen's Association, 1410 S. W. Morrison, Portland 5, Oreg. Because of the distinctive structural shapes that can be achieved with the laminating process, members of this type are being utilized to solve special problems in the construction of modern residences, the Association says.

Many of the strength properties of structural laminated lumber have been found to be greater than those in comparable sizes of solid timbers. The specifications in the 8-page booklet are based on data developed during several years of research by the Forest Products Laboratory of the Forest Service of the United States Department of Agriculture. Allowable unit stresses for both wet and dry conditions are given.

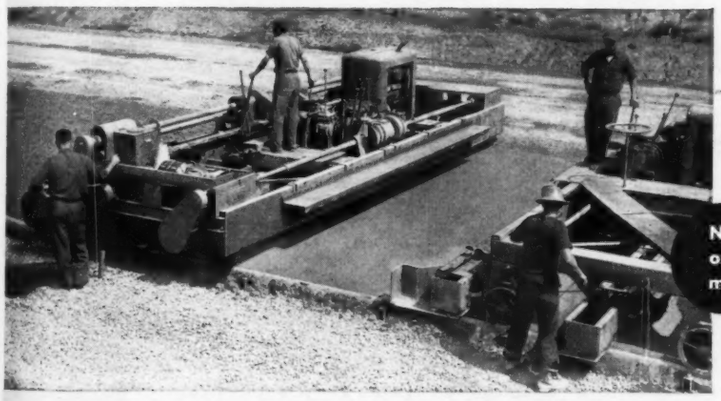
Because of the distinctive structural shapes that can be achieved with the laminating process, members of this type are being utilized to solve special problems in the construction of modern residences, the Association says.

This literature may be obtained from the association, or by using the Request Card at page 16. Circle No. 905.

Changes at Caterpillar

The Caterpillar Tractor Co., Peoria, Ill., has announced several promotions and organizational changes. Robert C. Brown has been promoted to Assistant Director of Research, handling engine development. Norman K. Alberts, former service representative in Albany, N. Y., is now Assistant Export Service Manager. Nicholas Kent, the service representative in Jacksonville, Fla., for four years, is Service Manager of the Plains Division.

do what machines could never do before



Note how oscillating screed on spreader accurately meters material to finisher

Jaeger 3-Screed Paving Team gives steady high production of better finished slab

Latest Screw-and-Screed Spreader remixes, compacts, and strikes-off material as fast as dual drum pavers can produce it, *then, with its oscillating 12" screed, accurately meters the exact amount of material required* for the finishing machine. No excess or deficiencies, no costly carry-back, always uniform compression under the finisher screeds.

Type "X" Finisher, with its transverse front screed and diagonal rear screed, gives a precision finish, *can carry material uphill and place it solidly against higher form on pitched slab and superelevated curves*, eliminates much costly hand work and finishes harsh material faster without tearing.

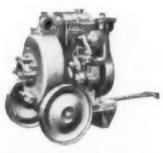
This 3-screed "team," exclusive with Jaeger, has saved the cost of a second finishing machine on high production work in various States. Screw-and-Screed Spreader is also adaptable for bituminous pavements. Ask for Catalogs FX-8 and CSS-0.

"New Standard" AIR-PLUS Compressors deliver 15% to 25% more air, to do 30% to 40% more work

Two heavy duty breakers, powered by a Jaeger Model 125 compressor, will break pavement up to 40% faster than the same tools run by any 105 ft. compressor. From the Model 75, for one breaker, up to the Model 600, for two heavy duty wagon drills plus an auxiliary drill, Jaeger "new standard" sizes provide the additional air you need to run a full set of tools at top pressure instead of weak 70 lbs.—delivered at the lowest cost per cubic foot of air of any compressors on the market. Ask for Catalog JC-1.

"Speedline" Mixers

More batches per hour with fast "Skip Shaker" loader and thorough mixing, fastest discharging "Dual Mix" drum. Machined steel drum tracks, automotive-type transmission. Sizes 3½S to 16S portables.



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Portrait in Print

By BILL QUIRK

Fifty Years Building the Big Ones

• THE only thing wrong with the company slogan "New York City's Sky-Line . . . Thompson-Starrett's By-Line" is the geographical limitation that it implies. For Thompson-Starrett Co., Inc., during the past fifty years, has been adding not only to the skyline of New York City, but to that of some thirty states, the District of Columbia, Canada, and South America as well. While the concentration of activity has been mainly on building projects, both commercial and industrial, this veteran firm of general contractors has demonstrated its versatility by constructing dams, aqueducts, army camps, shipyards, and even ships. Shipbuilding was a phase of the company's World War II effort when it constructed 12 tankers and 82 Liberty ships of the 10,000-ton class.

Right now, when all builders see written on the wall Government orders halting commercial construction, Thompson-Starrett is again prepared to adjust itself to meet the moods of the times. "We have done this twice before", said J. R. Van Raalte, President of the firm, with a trace of a rueful smile on his tight lips. "In both World War I and World War II we shifted from peacetime building to war construction, and we can do it again. Here is a letter calling a halt to a big office building we were just about to start erecting in Washington, D. C. And there are others like this we can expect too."

At his large desk in company headquarters on Madison Avenue in midtown Manhattan, Van Raalte gives the impression that he intends to continue, into the second half of the 20th century, the same record of successful progress that Thompson-Starrett achieved from 1900 to 1950. The President joined the firm in 1944, when T-S was busy building ships at the shipyards it had just constructed on the St. Johns River near Jacksonville, Fla.

Midwest Touch

Prior to that time Van Raalte, after studying engineering at Dartmouth College, had been engaged in building construction in the midwest. With his father, a St. Louis builder, he had been erecting hotels and apartment houses since 1922, chiefly in St. Louis and Kansas City. He came to Thompson-Starrett as a Vice President, and made the step to the top in 1949. Now 55, Van Raalte is a solidly built 185-pounder, 5 feet 10 inches tall, with thinning hair and steady brown eyes.

He succeeds in the post of president some well known construction men who have been at the helm of Thompson-Starrett. Peter W. Eller, for example, now Chairman of the Board of Governors, Building Trade Employers' Association of New York City, was T-S President from 1943 to 1947. A former steel worker, Eller brought about the wage-stabilization agreement between unions and employers that was responsible for the uninterrupted building program in metropolitan New York from the end of the last war until now.

Big Building Era

But the man who made the greatest impact on Thompson-Starrett was Louis J. Horowitz, its guiding spirit in the lush and profitable years 1910 to 1934. The fabulous Horowitz, egotistic and daring, served T-S as President from 1910 to 1928, and as Chairman of the Board from 1928 to 1934 when he retired with a sizable fortune. Super salesman, contract hunter, promoter, and possessor of an uncanny ability in financial transactions, Horowitz was the magnetic force in getting for his firm some of its most important contracts. During the years of his association Thompson-Starrett constructed such well known landmarks as the Woolworth Building, Equitable Office Building, Municipal Building, and Waldorf-Astoria Hotel in New York City; General Motors Building in Detroit; Union Trust Building in Cleveland; and Palmer House in Chicago, to mention only a few.

All these buildings were marked by certain superlatives of size that set them apart from other structures. At the time of their completion, for instance, the Woolworth Building was the tallest office building; the Equitable, the largest office building; the Municipal Building, the largest administrative building for municipal offices; the Waldorf-Astoria, the tallest hotel; General Motors and Union Trust, the second and third-largest office buildings; and the Palmer House, the largest hotel. These superlative descriptions were meant to include the entire world, of course.

C. & E. M. Photo

J. R. Van Raalte, President of Thompson-Starrett Co., Inc., joined the firm in 1944 and made the step to the top in 1949.

How It Started

One must go back to 1907 to find an original founder of Thompson-Starrett as a company head. In that year Theodore Starrett retired as President, having succeeded Henry S. Thompson in 1901. In the beginning the firm was called Thompson & Adams, before Theodore Starrett, eldest of the five famous Starrett brothers and the prima donna of the family, replaced Adams. The other brothers were Paul, Ralph, Goldwyn, and William. Their father

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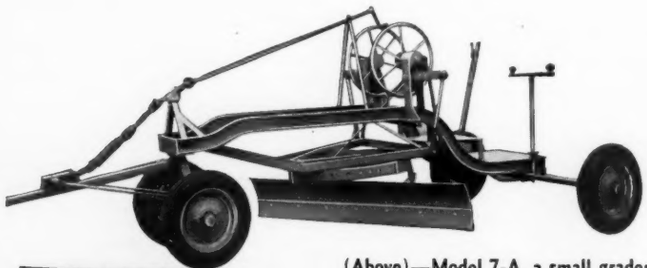

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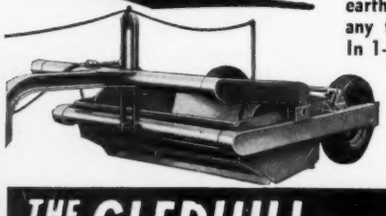
(Above)—Model 7-A, a small grader but a big performer with many good features. Also, the Model 80, heavier, better for high banks with its longer reach.

(Left) — A compactly designed, strongly built, reasonably priced earth mover that can be used with any tractor. Has hydraulic controls. In 1-yd. and 2-yd. sizes.



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was a Scotch-Irish Presbyterian clergyman, but all the sons made building construction their life's work.

All but Paul, who headed the George A. Fuller Co., a business rival, were in Thompson-Starrett during the early years of the century. All subsequently dropped out. Later, brothers Paul and William teamed up in Starrett Brothers, which has now become Starrett Brothers & Eken, Inc., one of New York's big building contractors.

In its heydey, Thompson-Starrett eschewed the lump-sum, competitive bids for the fixed-fee type of contract, besides handling most of the subcontracting work itself. This was in sharp contrast to past and present methods of many large builders, some of whom act merely as brokers, subbing out practically all the various items of work. But the present officers of T-S are not looking backward into the golden Twenties when prices were right, taxes were low, materials were abundant, and competition less keen. Neither are they dwelling on the tremulous Thirties when the depression played havoc with real-estate holdings.

Current Work

With experienced department heads to rely on, President Van Raalte is pulling Thompson-Starrett back up again among the leading firms of building contractors. He is hoping that international difficulties can be remedied so that normal peacetime construction, so badly needed, can be resumed.

At present, T-S has under construction: addition to Mount Sinai Hospital in New York City; Owls Head Sewage Treatment Works in Brooklyn; U. S. Naval Hospital at St. Albans, Long Island; American Cyanamid Co. plant, Pearl River, N. Y.; and the second unit of the Jordan Marsh department store in Boston, Mass. The firm has about 1,000 men employed in these projects, together with a force of 55 in its New York headquarters, and small staffs in branch offices in Boston and Washington, D. C.

In Europe, Thompson-Starrett is currently associated with an Italian group of constructors on the design and construction of two large hydroelectric projects in Greece, scheduled for completion in 1952. This is being done under the Economic Cooperation Administration, with Ebasco Service, Inc., acting as management agent for the Greek government.

Department Heads

Overseas work for T-S is handled by Leon P. O'Connor, Vice President of Foreign and Emergency Operations. One of five vice presidents, Lee O'Connor is the newest official of the company, having joined Thompson-Starrett only last year. He hails from Chicago where he studied at Lewis Institute and De Paul University before going into construction. Tall, rugged O'Connor came east in 1930 with Byrne Bros. Construction & Engineering Co. to sink caissons for St. Johns Park Terminal of the New York Central Railroad. He later became General Superintendent for George M. Brewster & Sons, Inc., of Bogata, N. J. In 1935 he went into business for himself as L. P. O'Connor, Inc., constructing approaches to the Lincoln Tunnel in New Jersey, a dam in Ohio, the Northern Boulevard Bridge in Flushing, and sections of the Triborough Bridge in New York. Some fancy legerdemain and a home-town decision in the courts lost O'Connor his biggest contract—foundations for the new Criminal Courts Building in Manhattan.

In 1941 the gray-haired builder undertook his toughest job yet as General Manager of Construction for Pan American Airways. He traveled the world over, developing airports at the request of the President of the United States, since the Government itself could not undertake the work with this country still theoretically not in the war. These airfields stretch from the jungles of Guatemala around the globe to darkest Africa, touching fifteen different countries, and providing refueling and reconditioning facilities in most cases less than 500 miles apart. Certain phases of this grueling work have still never been fully revealed by O'Connor or anyone else, nor have the potential benefits to this country been completely recognized.

After four years with Pan American, O'Connor journeyed to Greece for Johnson, Drake & Piper, Inc., on rehabilitation work including the construction of roads, bridges, tunnels, railroads, and airports. From there he returned to America and joined Thompson-Starrett.

Voices of Experience

The other four T-S vice presidents have long years of service with the company. Incidentally, the age spread of the

(*Concluded on next page*)

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Only $69.50

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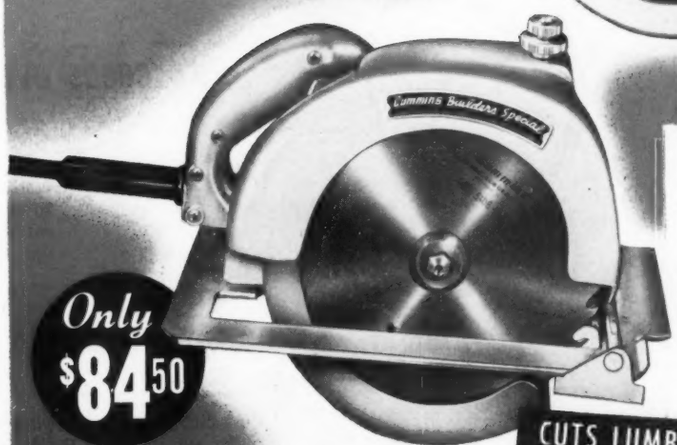

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It fills ALL your cutting needs on every sawing job! Cuts 2-5/8" on square cut; 2-3/16" at 45°.

CUTS LUMBER 2 3/16" THICK AT 45°

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FAIR HAVEN, MICH.
Use "Messenger" Service

Fifty Years Spent Building the Big Ones

(*Continued from preceding page*)

six top officials is 53 to 60, with 56 the average. William W. Westfall, Vice President in Charge of Purchasing and Subcontracting, has been with the company for 43 years. Working days as an earnest young clerk while attending Mechanics Institute at nights, he advanced himself in the company step by step. By 1929 Westfall was promoted to a vice presidency.

Next in years of service is Henry A. Buschen, Vice President and Chief Engineer, who started in 1912 as an office boy, and studied evenings at Cooper Union and Pratt Institute.

J. M. Steinmuller, Vice President and head of the mechanical department, came to Thompson-Starrett in 1919 after Cooper Union training. He now supervises the installation of mechanical equipment in building projects, after first getting out the estimates, and awarding the necessary subcontracts.

The construction department is headed by Vice President Rodney S. Smith who started with Thompson-Starrett in 1920. He was educated at Rensselaer Polytechnic Institute, Troy, N. Y., and spends most of his time in the field covering company projects.

The Years Ahead

No one at Thompson-Starrett ventures to predict what lies ahead in these war-troubled years. During the first World War the company built Camp Upton at Yaphank, Long Island, and a $65,000,000 explosives plant at Nitro, W. Va. The latter was done in only eight months. Besides the aforementioned ships and shipyard, Thompson-Starrett efforts in the second World War included Fox Hills Cantonment on Staten Island; Fairlington Housing in Arlington, Va., for military and civilian Government workers; Materials Testing Laboratory and other buildings for the U. S. Navy at the New York Naval Shipyard; and other construction projects. In the Navy program, T-S built a sawmill and a boat shop of timber to save needed critical steel. The 125-foot-high 3-story structure had timber columns, timber trusses, and even plate girders made of plywood. Remarkably enough, the largest piece of timber used was only a 4 x 16, not over 24 feet long.

The record of ingenuity in construction, practiced by Thompson-Starrett in peace and war, has been demonstrated time and again over the past 50 years from one end of the country to the other. Thus after building the luxurious Waldorf-Astoria Hotel on New York's swanky Park Avenue, over a maze of railroad tracks entering Grand Central Station, the company went west to construct the Colorado River Aqueduct through the desolate desert lands of southern California. This 16½-mile project of cut-and-cover conduit and siphons, in places 60 feet underground, was done under such conditions as 120-degree summer temperatures, using specially built crushing, batch, and concrete-mixing plants, and a new type of collapsible steel forms.

Crowded city or lonely wastes, grand hotel or water tunnel are taken in stride, the big projects along with the small. Yes, the small, for Thompson-Starrett once shingled a roof during an era when it was primarily concerned with million-dollar skyscrapers. This job was the only one of its kind T-S ever did, and like all the others was performed to the complete satisfaction of the owner. The shingling was done for the late Mrs. Theodore Roosevelt of Sagamore Hill, Long Island, widow of the former President, and a friend of the company.

Obviously a call to Thompson-Starrett is not recommended if you only want a new roof put on a house. For that long-established firm of general contractors and builders is counting on building the big ones for the next fifty years and more, the same as it has been doing in the fifty years just passed.

C. & E. M. Photo

Seated, left to right, are T-S Vice President W. W. Westfall, President Van Raalte, and Vice President J. M. Steinmuller. Standing, left to right, are Vice Presidents Rodney S. Smith, H. A. Buschen, and Leon P. O'Connor.

Soil-Stabilization Methods

A revised and enlarged edition of "Soil Stabilization Methods", a 100-page handbook, is available from Seaman Motors, Inc., 305 N. 25th St., Milwaukee 3, Wis. It covers the history of soil stabilization, materials and design, construction and reconstruction procedure, shoulder work, and special construction uses. It also covers base and surface courses, the importance of moisture control, mixing bituminous products, and the use of Seaman equipment in this work.

The booklet is detailed in its description of each stage of operation and is fully illustrated with on-the-job photographs. Diagrams and drawings are used where necessary.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 953.

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Recognized laboratory engine tests are important in establishing qualifications of lubricants to meet strict requirements. More important to operators, however, is the *tremendous increase in engine life* and the consequent reduction in maintenance expense and time out-of-service that the new Shell Rotella Oil is contributing to fleet operation under today's conditions.

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By RAYMOND P. DAY,
Western Editor

• LOLO National Forest in Idaho, one of the last great wild areas of the northwest, is being pierced by a modern highway. The Bureau of Public Roads is spending approximately $114,000 per mile to grade the new highway, which eventually will provide a short route between Missoula, Mont., and Lewiston, Idaho.

Miller & Strong, Inc., contractor of Eugene, Oreg., has been busy with 1.8 miles of grading and 6 miles of clearing down the Lochsa River from Powell Ranger Station. It was an unusual, almost savage job. Clearing was exceptionally heavy, the rock was solid blue granite, access to the area was none too good, and the black bears were so familiar with people that one ripped the kitchen door off the cook shack, backed the cook into a corner, and stood there growling until General Foreman H. I. Steele killed the animal.

According to Bureau of Public Roads officials, several good economic reasons exist which justify the construction of the highway. The Lochsa River, bordering the Selway-Bitterroot Wilderness Area, passes through the heart of a fine recreation area, which with the construction of the highway will be accessible to more people. One of America's finest timber stands is in this open area north of the river, and logging should accelerate after the road is finished.

C. & E. M. Photo

A Northwest 80-D shovel loads blasted rock to an end-dump truck on the Lolo National Forest road in Idaho. A Koehring Dumptor stands by.

Road 26 Feet Wide

The highway follows a general course down the Lochsa River, with easy grades and curvature up to 14 degrees. The roadbed is 26 feet wide, and subsequent contracts will provide the subbase and surface. The recent work consisted of getting the trees down, burning the log piles, building a pioneer road, and finishing the grade within the authorized area.

Clearing Is Big Job

One of the most rugged parts of the work was the heavy clearing. The right-of-way was covered with a dense stand of fir, cedar, spruce, tamarack, pine, and other evergreen trees. Many were over 4 feet in diameter at the butt.

In order to maintain access for the clearing crew to the best advantage, so walking to and from work would be reduced, Miller & Strong built a pioneer road generally ahead of the tree sawing. A Caterpillar D8 with a Caterpillar angle-blade dozer, with an experienced pioneer operator, Wayne McCool, at the controls, did this work. In many places light jackhammer work and blasting was necessary. Trees were removed only if they were within the narrow limits of the pioneer trail. In a few places the pioneer road had to be built with the tree cutting, or slightly behind it, but generally it stayed out ahead.

Clearing consisted of sawing, bucking, and piling the timber in neat stacks which could be burned after the fall rains reduced the general fire hazard. One 5-foot McCulloch chain saw, and two 18-inch McCullochs dropped the trees. The power saws were fast and mobile. Many trees, which normally might fall outside the right-of-way lines, were notched so they would fall within the limits.

After the same saws bucked the logs up, a Bucyrus-Erie 22-B crane, working with a set of logging tongs on its load line, moved in on the pioneer road and stacked the logs into tight, straight piles. According to Mr. Steele, a crane of this kind is much more efficient for heavy piling than a tractor.

Since the clearing was all out ahead of the grading project, it did not interfere with that phase of the work. A 4-wheel-drive truck left camp every morning at 6:20 a. m., 6 days a week.

(*Continued on next page*)

Stepped up cleaning action...

Even greater anti-wear protection

. . . anticipating the needs of today's high performance fleet engines

TODAY'S hauling conditions are imposing greatly increased demands upon fleet engines . . . and the lubricants selected to keep them running. At the same time these high-performance engines are expected to turn in ever-increasing mileage records between overhauls.

For these reasons, and because even greater performance will probably be expected as time goes on, the detergent-dispersant and anti-wear qualities of Shell Rotella Oil have been markedly increased.

Operators using Shell Rotella Oil in the past will find an even greater latitude in maintenance procedures.

4-WAY LIFE EXTENSION FOR BUSY ENGINES

1. Remarkable detergent-dispersant action

The ability to suspend contaminants has been deliberately stepped up in the new oil. Field tests on vehicles, in widely varying kinds of service, prove conclusively that this greater detergent-dispersant action extends mileage between overhauls.

2. Drastic sludge reduction

Operators who have been having sludge troubles . . . with clogged pump screens, burned out bearings, or clogged oil ways . . . are urged to find out for themselves how remarkably clean those engines will remain while using this new anti-sludge Shell Rotella Oil.

3. Positive Anti-acid action

New Shell Rotella Oil directly counteracts the acid action of fuel combustion products in the vital top-cylinder zone . . . with correspondingly great reduction in wear. This protection is extremely important in the operation of intermittently loaded engines.

4. Extends time between engine overhauls

New or reconditioned engines . . . operating on fuels of widely-varying quality . . . in all kinds of fleet service . . . have demonstrated an important extension of in-service time. *This gain results from improvement in several basic respects: freedom from sludge and ring-clogging, increased valve life and greatly reduced wear.*

SHELL

for all heavy duty fleet engines

Using a McCulloch saw, workmen start a notch in a tree . . .

With the saw angled down, they finish the notch . . .

Then sawing from the other side, they make the main cut.

They drive wedges in the notch of this Idaho evergreen . . .

With a crash the forest giant tumbles down. Miller & Strong cleared 6 miles on this job.

Road Builders Grade Wilderness Highway

(*Continued from preceding page*)

It returned with the men 10 hours later, with the exception of Saturday, when the men worked only 8 hours.

Heavy Granite Hard to Move

While the grading quantities were bid unclassified, preliminary scouting had shown that there was a high percentage of solid blue granite rock to drill and shoot. It lay in blocky pieces, with occasional earth seams that made for tough shooting.

A 500-cfm Le Roi compressor, with a 350-cfm Worthington Blue Brute machine, furnished the air power. Drilling rigs included 2 Ingersoll-Rand wagon drills and 5 jackhammers of assorted makes. Timken drill steel in lengths up to 26 feet, with Timken tungsten-carbide bits, did the drilling.

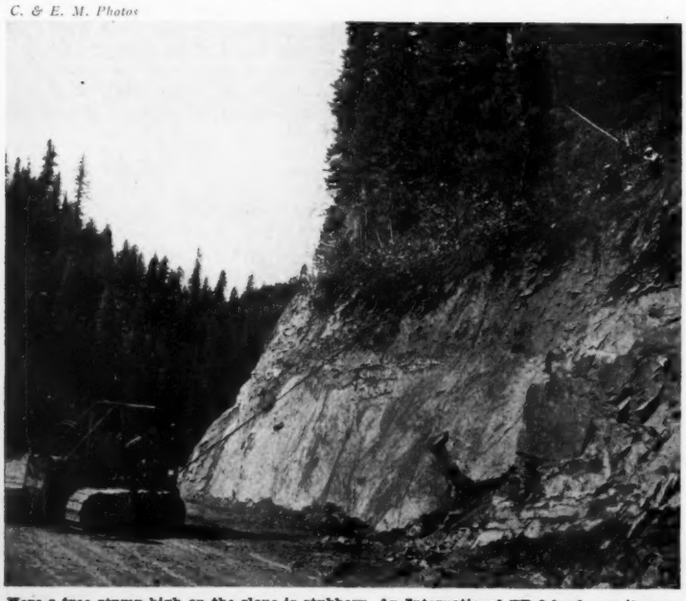
The holes were put down on varied centers, depending on the formation. The granite rock was hard. Even with the tungsten-carbide bits, wagon drills averaged only 120 feet a shift, while the jackhammers got about 60 feet. The bits wore down to the resharpening point after 40 feet of drilling, and one resharpening was then made.

Pacific powder was loaded into the holes, and instantaneous shots were pulled by a blasting machine. The granite broke in generally large pieces, but since the loading dipper was 2½ yards in size, little secondary shooting had to be done.

Blasted rock and dirt was handled by a Northwest 80-D shovel, which loaded to 2 Koehring Dumptors, 2 Athey Forged-Trak trailers, and a Sterling

(*Concluded on next page*)

C. & E. M. Photos



Here a tree stump high on the slope is stubborn. An International TD-9 hooks up its rear cable to the stump and jerks it loose.

The Lochsa River, along which the highway will go, borders the Selway-Bitterroot Wilderness Area. Here a 22-B Bucyrus-Erie crane stacks some of the felled logs.

10-yard end-dump truck. There was a place for all the material in heavy fills along the right bank of the river. The material was end-dumped, placing the largest rocks out along the toe of the riverward slope.

It seems likely as this is written that the graded embankments may be open to traffic and spring groundwater for several seasons, at least, before surfacing is done. This will give the embankment a good chance to develop its final settlement.

Personnel

BPR personnel in charge of the project includes L. H. Huggins, District Engineer of Boise, Idaho, and Robert Simmonds, Resident Engineer.

Both Neil Miller and Chuck Strong, partners of the contracting firm, were on the project, assisted by H. I. Steele as General Foreman. Most of the crew consisted of veteran old woodsmen and road builders with a love for this kind of primitive country. Typical of these men were Lee Caldwell, Master Mechanic; Nels Christofferson, Shovel Operator; and Harry Simos, Chief Powderman.

With their work to keep them busy, and excellent camping and fishing close by for recreation, the men all said that this tough little back-country grading job was one they would long remember with pleasure.

Precast Concrete For Bomb Shelters

Precast concrete can be used for the construction of emergency atom-bomb shelters and for the protection of existing structures, said Arsham Amirikian, Head Designing Engineer, Bureau of Yards and Docks, Department of the Navy, Washington, D. C., at the 47th Annual Convention of the American Concrete Institute. The readily assembled framing elements can be prefabricated at regional plants and stockpiled at various points for immediate use in an emergency.

Ribbed-shell circular frames (a precast version of the well known Quonset hut), ribbed-shell gable frames, and ribbed-shell domes are the best types of construction, said Mr. Amirikian, for the area nearest to ground zero of the air-burst bomb. The shelter should be covered with earth to provide protection against nuclear radiation.

In the circular area between the ¾ and 1-mile radius, no earth cover is required for shelters. There the framing can be the same as that used in Area One except that the ribs should project inward to provide a more favorable pressure surface. A rectangular shelter of cellular panels may also be used in this area.

In the area outside the 1-mile radius, the strength and stability requirements for shelters can be met with panel and rib framing of the sort used in low-cost housing units.

Some existing structures outside the 1-mile radius — narrow single-story brick or frame buildings—can be provided with the necessary protection by an external shell enclosure. When the width of the building exceeds 20 feet, the reinforcing panels need an independent supporting system. This means erecting a complete frame to enclose the existing structure.

Report on Surface Drainage

Research Report No. 11-B of the Highway Research Board is called "Surface Drainage". It includes a committee report and three research papers sponsored by the Board's Committee on Surface Drainage.

The committee report summarizes hydraulic and hydrologic research under way in the United States.

A report on "Flood Frequency" by Tate Dalrymple, U. S. Geologic Survey,

C. & E. M. Photo

Shovel Operator Nels Christofferson (left) and General Foreman H. I. Steele.

describes modern techniques for making flood-frequency analyses using stream-discharge records. It shows how gaging-station records for a large region may be applied for estimating flood frequencies on local ungaged streams.

"Surface Runoff From Agriculture Watersheds" is the name of a paper by W. H. Potter, U. S. Department of Agriculture. It describes characteristic differences in the hydrologic behavior of small and large watersheds.

Committee Chairman Carl F. Izzard reports, in the third paper, a cooperative investigation at the University of Illinois on hydraulics of storm drains for express highways. His paper is called "Tentative Results on Capacity of Curb Opening Inlets".

Copies of the report cost 90 cents each. They may be obtained from the Highway Research Board, National Research Council, 2101 Constitution Ave., Washington 25, D. C.

Data on Building Products

A data sheet on products for building contractors and others has been prepared by Haynes Products Co., 4007 Farnam St., Omaha 3, Nebr. These products include water repellents for masonry surfaces, toxic repellents for protection against termites, paint protectors, paint removers, roof coatings, cement paints, rubberized enamel, and cement hardeners. A brief description is given for each of the products.

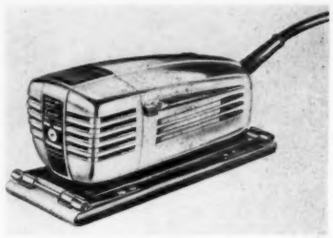
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 898.

A GREAT NEW WORK HORSE
that makes light of heavy work
GENERAL
DUAL TRACTION LUG
"TOUGH" is the word for this workhorse of a tire! It's built, and we mean *really built* from the beads to the tremendous power-traction tread, for more pull under terrific loads. Put these great General Dual Traction Lug Tires on your heavy off-the-road equipment and you'll get every heavy job done faster, easier, at lower cost. Ask your nearest General Tire Dealer to demonstrate the D. T. L. to you today!
THE GENERAL D.T.L.
REQUEST GENERAL TIRES ON YOUR NEW EQUIPMENT

A Finishing Sander With Orbital Motion

A new finishing sander featuring orbital motion has been developed by The Porter-Cable Machine Co., Syracuse 8, N. Y., The Model 105 is not a "vibrator" sander, but a motor-driven machine with two counterbalanced transmissions, the company says. The abrasive pad revolves in a 3/16-inch-diameter orbit at 5,000 rpm; the abrasive grits travel in tiny, overlapping circles producing a uniform smoothing action.

In addition to woodworking applications, the Guild sander may be used for sanding metal and enameled metal surfaces. In body shops, it handles such jobs as preparing base surfaces, feather-edging, leveling solder joints, and smoothing primer.



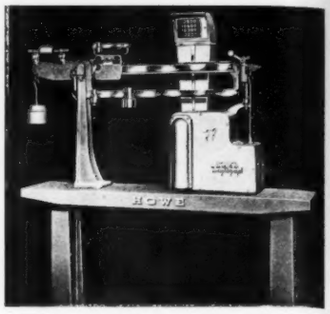
The new Guild sander is a motor-driven machine featuring orbital motion.

The sander is 9 inches long, 3 inches wide, and 3¾ inches high, and weighs 5 pounds. It is maneuverable in corners and close to trim or molding. Its removable sanding pad uses ⅓ of a standard 9 x 11-inch abrasive sheet. Accessory equipment includes extra pads for contour sanding, polishing, and rubbing; an abrasive cutting template; and a steel carrying case.

Further information on this new Guild sander may be secured from the company. Or use the Request Card at page 16. Circle No. 941.

Davis Plywood Branch Moves

The Toledo branch office and warehouse of the Davis Plywood Corp. has moved to 1502 Elm St., Toledo 8, Ohio. This new address is temporary, pending a move later this year to a newer and larger warehouse at 303-305 S. Division St.



When attached to a beam scale, the Weightograph records weights on a screen in large illuminated figures.

Scale Attachment Gives Fast Reading

A new development in automatic scale indications has been announced by The Howe Scale Co., Rutland, Vt. The Howe 77 Weightograph accessory can be attached to any make of beam scale, or to any scale convertible to beam operation, to provide quick eye-level reading.

It is attached to the beam shelf and connected with a rod. A nonprotruding periscope with a mirror-reading screen instantly flashes the exact weight in large illuminated figures. Image brightness and contrast are said to be increased five times. The light source is a prefocused projection lamp with a bayonet lock. There is no need to adjust the position of the lamp, Howe says. A large condensing lens with a heat filter intensifies the light on the chart.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 929.

Motor Grader Converted For Fine-Grading Roads

There is "another way of doing your fine-grading", says Roadgrader Gauge Corp., P. O. Box 1087, Wilmington, Del. The company's new 4-page bulletin explains how the Roadgrader Gauge may be attached to the motor grader to enable fine-grade work on lanes of various widths without disturbing the alignment of the forms. The gauges may be easily attached and removed from the grader moldboard, the literature says, and will not interfere with other operations of the grader. Grading may be controlled to any desired depth.

The company also points out that a rubber-tired third wheel is furnished. This is used, when necessary, to run the gauge on a concrete slab. Illustrations of the gauges in use are included in the folder.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 891.

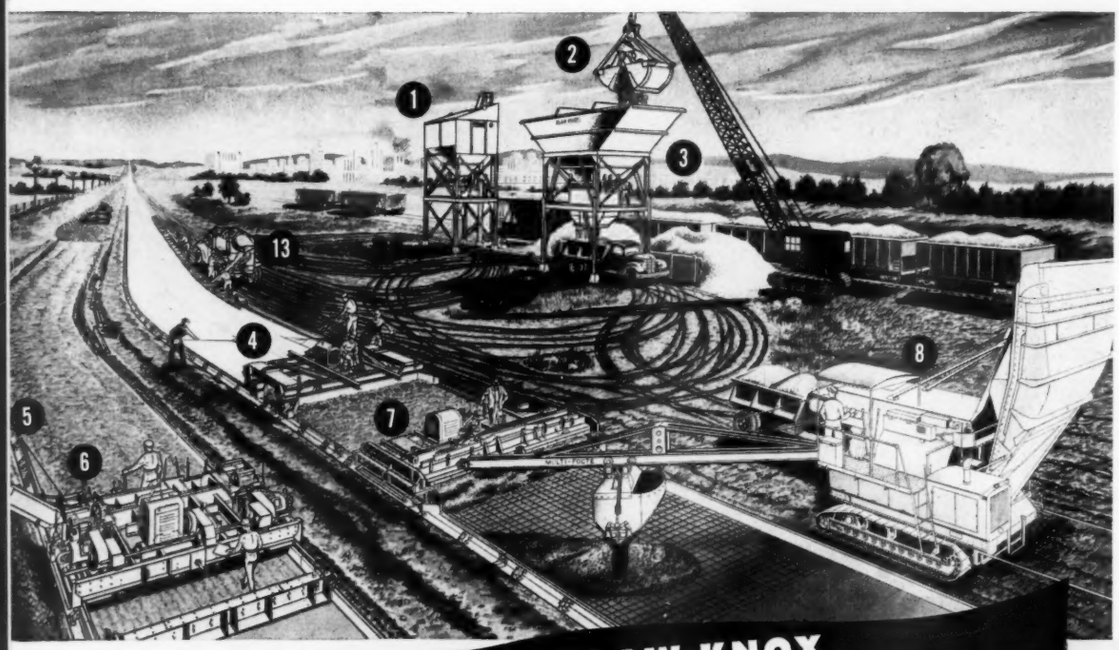
Water-Well Supplies

The second edition of its composite water-well-supply catalog is now available from The National Supply Co., P. O. Box 416, Pittsburgh 30, Pa. The new 128-page looseleaf version of the book first issued in 1949 has been enlarged about 15 per cent and now contains nearly 200 indexed types of supplies. These range from well adaptors to whipstocks and from bolts and nuts to complete water systems. Each product is fully described and illustrated.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 950.

Correction

We are sorry that we gave our readers an incorrect address for the manufacturer of the corrosion-resistant coatings described in the item on page 98 of the April issue. The correct address of Continental Coatings Corp. is 304 East 44th St., New York 19, N. Y.



The BLAW-KNOX
MATCHED EQUIPMENT PACKAGE
earns *more money* on every job!

CHECK these money-earning advantages of the Blaw-Knox "Complete Package" of concrete construction equipment—with each unit MATCHED to the others, and the entire package MATCHED to the job!

You get every piece of paving equipment you need for each project—from handling material to finishing the slab. You get the assembly-line efficiency of a balanced fleet of units designed to work together. You get lower operating costs—the result of 100% mechanization. You get everything from one source—backed by one responsibility to protect your investment. You get the solution to your service and parts problem through a nation-wide distributor organization. One Blaw-Knox trained man can service practically all your equipment.

These are a few of the reasons why more and more contractors are finding it practical and profitable to use the Blaw-Knox "Complete Package" of matched equipment. Ask your Blaw-Knox distributor for information on "Complete Package" jobs.

The BLAW-KNOX "Complete Package" of paving equipment

1. Bulk Cement Plants
2. Clamshell Buckets
3. Aggregate Batching Plants
4. Finishing Machines
5. Steel Paving Forms
6. Precision Subgraders
7. Paving Spreaders
8. MultiFoote Pavers
9. Adnun Black Top Pavers
10. Concrete Buckets
11. Steel Curb and Gutter Forms

The BLAW-KNOX "Complete Package" of ready-mix equipment

2. Clamshell Buckets
12. Truck Mixer Loading Plants
13. New Hi-Boy Trukmixer

BLAW-KNOX DIVISION of Blaw-Knox Company
Farmers Bank Bldg., Pittsburgh 22, Pa.
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A young contractor-to-be studies his new bright-red toy Heiliner. A working counterpart of the Heiliner, it scrapes sand or dirt, hauls it, and dumps it.

Toy Working-Model Scraper and Hauler

Young contractors-to-be will learn some basic principles of highway construction with the new model Heiliner introduced by Charles W. Doepke Mfg. Co., of Rossmoyne, Ohio. The new toy is a combination earth scraper and hauler and is a working counterpart of original equipment made by the Heil Co., Milwaukee, Wis.

Controls permit a child to open the rear unit to scrape sand or dirt into the trailer, close the trailer, raise the unit, and open it again to dump the load. Tractor and scraper are joined as a single unit by a pivot post. The front end of the scraper is opened by a friction-operated ram to pick up a load of dirt. A thumb release closes this section automatically. For dumping, the ram is again operated, raising the back part of the scraper and opening the front end simultaneously. A knurled steel knob raises or lowers the entire scraper to adjust the scraping depth.

Finished in bright-red enamel, the new toy is made of automobile-grade steel with electrically welded parts. Heavy-duty rubber tires prevent damage to floors or furniture when used indoors.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 912.

Bulletin on Concrete Pumping

A new bulletin on the Rex Pumpcrete has been released by Chain Belt Co., 1666 W. Bruce St., Milwaukee 4, Wis. It describes the Pumpcrete machine and the method of pumping concrete through a pipeline. It indicates the types of jobs the Pumpcrete will work on to advantage, what mixes it will handle, and the height and distance requirements of a placing job.

This literature may be obtained from the company by requesting Bulletin No. 51-31, or by using the Request Card at page 16. Circle No. 878.

Portable Compressor For On-the-Spot Use

For local use or service in some out-of-the-way spot, P. K. Lindsay Co., 97 Tileston St., Everett 49, Mass., recommends its new lightweight portable air compressor Model 33. Mounted on a 2-wheel trailer assembly, Model 33 can get around on the job, and can power clay spades, rock drills, paint guns, and other air tools. It is self-contained, and has a trailer box large enough to carry hose, tools, and other material required on the job.

P. K. Lindsay Co. recommends its portable Model 33 compressor for service in out-of-the-way spots.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 865.

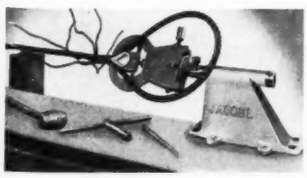
Portable Generator Plants

A circular describing the Model M-1 gasoline-powered generator, designed for operating vibrators and electric hand tools, has been prepared by Electric Tamper & Equipment Co., Ludington, Mich. The unit is shown mounted on dual pneumatic wheels, but skid mounting is also available. Specifications and features of the unit are given.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 936.

TORQUE MASTER

The Modern Answer To Wire Rope Splicing



Time-Tested in both Industrial and Armed Service Use.

Swivel Acting Jaws — Torque Control mean savings in Splicing Man-Hours—up to Fifty Per-cent.

Limited stocks still available for immediate delivery to industry.

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(In Canada—Canada Wire and Cable Co., Toronto)

● GM 4, 6 and Twin 6 "71" engines power aptly named tugs, "Hustler," "Toiler" and "Producer." Standardized parts fit each engine regardless of size.

Building 47 piers for a bridge across the Turtle River at Brunswick, Ga., Diamond Construction Co. of Washington, D. C., depends on GM Diesel as the all-round power for boats, pumps, yard crane and concrete mixer.

These versatile Diesel engines do many different jobs well. They are two-cycle—deliver power on every piston downstroke. They accelerate rapidly because, with GM unit injectors, there's no lag in the fuel injection cycle. They deliver a smooth, steady power output—with twice as many power impulses for each turn of the shaft. This added power-per-turn makes them more compact with more horsepower for their size than other type engines. They start instantly on their own safe fuel. And high interchangeability of parts makes them easier and more economical to maintain.

Add up these advantages and you'll see why GM Diesels are offered as standard or optional equipment in over 500 kinds of power machinery by 120 different manufacturers. For the full story, call your GM Diesel distributor or write us.

● 2-cylinder GM "71's" on four 6" Jaeger dewatering pumps save their cost on fuel alone. These compact units are easily moved from pier to pier.

● 2-yard CMC auxiliary cement mixer is powered by a 3-cylinder GM Diesel engine. Produces 30 yards an hour.

Diesel Brawn without the Bulk

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES... Up to 275 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS... Up to 800 H.P.

GENERAL MOTORS

GM GENERAL MOTORS DIESEL POWER

What's to Be Built In Fiscal Fifty-Two?

Contractors Hear Predictions on Volume and Programs from Engineers, Navy, and Reclamation Chiefs

• ALMOST any attempt to estimate construction volume and conditions for 1951 and 1952 must rely heavily on guesswork, and no one at the Associated General Contractors convention in February was more aware of this fact than the estimators themselves. Nevertheless, their guesswork is the best available and merits study, especially now as we approach the halfway mark in this extraordinary year.

Managing Director H. E. Foreman of the AGC, in his annual report, spoke of the substantial volume of railroad and other heavy construction that is likely this year, with the emphasis shifting from normal public works to defense construction. Reclamation, he said (and the USBR representative later confirmed) is likely to fall off about 30 per cent, but the volume of flood-control and river-and-harbor work should not be cut much unless Congress takes more drastic action than is expected.

As for the conditions likely, Mr. Foreman stressed the continuing stiff competition among contractors, and the increasing shortages of equipment and repair parts. Military purchases are contemplated, he warned, that would take most if not all of the production of some sizes of earth-moving units.

Director John L. Haynes of the Building Materials Division, National Production Authority, said we are in the worst shape on copper and zinc. Even with the promised expansion in steel, "it is not here today", he reminded. And though we may look generally better off as to steel in 1951 than we looked a decade ago, we must remember that the population has grown 17 per cent since then, and more steel than ever goes into autos, kitchens, and so on. On a per capita basis, our present supply is the same as it was in 1940.

Private industrial construction, he predicted, will be between $500 million and $2 billion in 1951; public industrial construction, as exemplified by the military-arsenal and atomic-energy construction, will jump from the 1950 level of $250 million to around $1 billion; and the direct military and naval construction will increase 700 or 800 per cent. The total dollar volume, he thought, would be within a couple of billion dollars of last year's level, $28 billion.

Corps of Engineers: Civil Works

Contractors heard from Brigadier General C. H. Chorpening, Assistant Chief of the Corps of Engineers for Civil Works, on the power, flood-control, and navigation projects likely under the 1952 budget. Though the program was pared down after the start of the Korean War, the President's budget message last January provided $524 million for new construction, 57 per cent of it for multiple-purpose projects including hydroelectric power.

Old Hickory Lock and Dam on the Kentucky-Tennessee state line in the Cumberland River Valley is one of the projects authorized, to relieve the power shortage expected in the southeast by 1954. It is especially vital now, since the Oak Ridge atomic-energy

(Continued on next page)

¾ TON WINCH

$33.00 LESS ROPE

This Hand Winch is ideal for moving and installing heavy machinery, loading trucks, hand derricks, cranes, gin poles, loading logs, sawed lumber, loading implements on trailers, hoisting silage, pulling wells, etc. Can be bolted anywhere and operated in any position. Made of electric steel; bronze bushed; 2 speeds, 8.16 to 1 for heavy loads . . . 3 to 1 for fast operation . . . self locking to hold loads at any position. Overall Dimensions 12⅜ in. x 7⅛ in. x 7 in. Handle 10 in. long. Drum size 3 in. dia. x 6 in. long x 6 in. dia. flanges. Will hold 100 ft. ¼ in. Wire Rope. Illustrated with 50 ft. ¼ in. Wire Rope. Shipping Wt. 37½ lbs. GUARANTEED—Five-day returns privilege.

$43.45 WITH 50 FT. of ¼-in. WIRE ROPE

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DAREX AEA
AIR ENTRAINING AGENT FOR CONCRETE

ZEZERE DAM COMPLETED
first step to electric power for all Portugal

Opened January 21 by President Oscar Carmona, the Castelo do Bode Dam, Rio Zezere, Portugal, was constructed by British, Swiss, and Portuguese contractors at a reported cost of one million English pounds. **DAREX AEA** was chosen for this project to improve plasticity of the concrete as well as to reduce bleeding and segregation. Evidence from overseas that no other air entraining agent for concrete is as efficient as **DAREX AEA** . . . that no other costs so little per cubic yard of quality concrete. Write today for informative "Mr. Architect-Engineer" folder.

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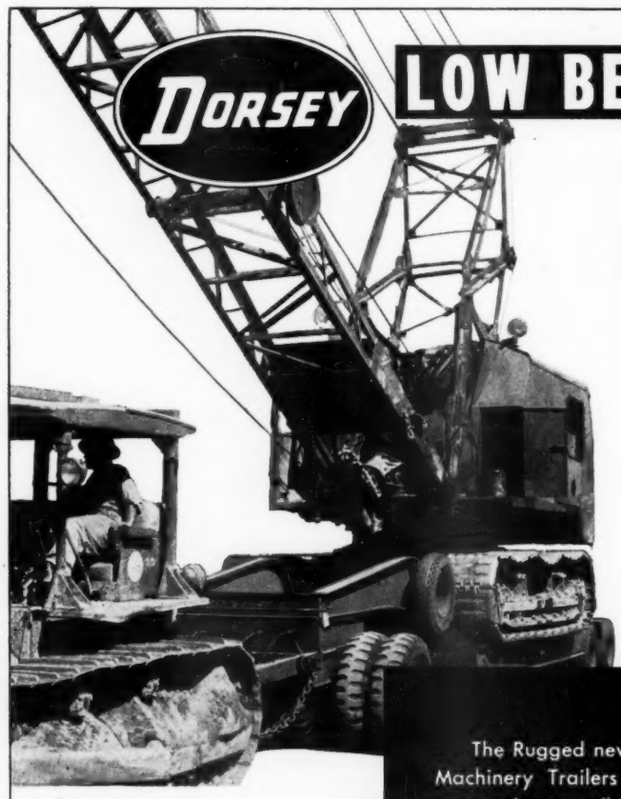
DEWEY AND ALMY CHEMICAL COMPANY
Cambridge 40, Mass. • Montreal 32, Canada



DORSEY

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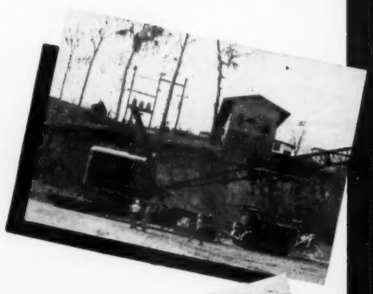
MT SERIES *Covers All*

TRANSPORTATION REQUIREMENTS

FROM **35 to 75** *TONS*



The Rugged new Dorsey MT Series Low Bed Machinery Trailers with four oscillating axles mounted on walking beams, distributing the load over sixteen tires . . .

Hydraulically operated air actuated brakes . . . eliminating brake rods and complicated braking system.

Simple construction provides ample margin of safety for loads exceeding rated capacity. Standard equipment includes many specially engineered items usually available only as "extras."

Converter dolly with quick detachable feature permits use as either semi or full trailer.

Dorsey Lowbeds Available in Capacities from 10 to 75 Tons.....

DORSEY TRAILERS

ELBA, ALABAMA

plant is in the area—also the Arnold Air Development Center at Tullahoma, Tenn. The Gavins Point project on the Nebraska-South Dakota state line on the Missouri River is another authorized project for power and flood control. Also the Dalles project on the Columbia River, which will provide 980,000 kw for the Pacific Northwest and improve navigation on the river; and Ice Harbor Lock and Dam which will improve navigation on the Snake River, a Columbia tributary, and supply 195,000 kw to the Pasco defense area and the Hanford Engineering Works of the Atomic Energy Commission.

Brigadier General Chorpening also mentioned as possible projects the St. Lawrence Seaway and Power Project, and the Niagara Redevelopment.

There are no materials priority ratings for these civil-works projects, he said. However, there is a definite procedure to be followed in gaining the assistance of the NPA. Suppose the contractor needs copper wire and has contacted unsuccessfully his regular suppliers. He then uses Form T-ENG 5656. He lists on it the names of the suppliers contacted and the reasons they gave for rejecting his order. He must also present evidence on the form of having tried to substitute other satisfactory materials; if it is not possible, he says why. The form, together with a Corps of Engineers statement of the necessity of the project, then goes to the NPA. If the NPA accedes to the request for assistance, it will place copper in the hands of a manufacturer, who will then relay to the contractor a corresponding amount of copper wire.

Corps of Engineers: Military Work

Major General Lewis A. Pick, Chief of Engineers, Department of the Army, also laid down some ground rules of procedure for contractors doing military construction. "The full scope of the military construction program cannot at this time be forecast accurately", he said. "The anticipated increase in the workload has trebled in recent months. Currently the work authorized through the fiscal year 1951—and for which funds have been made available for both Army and Air Force construction—totals $2.4 billion."

As to the type of contracts that will be used: they will be lump-sum or unit-price when plans and spex are complete enough, and negotiated or advertised depending on the time element involved. They will be cost-plus-a-fixed-fee when the completion date is such that planning and building must be begun at the same time, or when the project is off-shore or in areas where construction experience is lacking. Fixed-price contracts will be negotiated by soliciting proposals from qualified contractors. Geography will be important in determining qualified contractors, but the geographical areas will be kept large. The Engineers' policy of using small contractors where appropriate will continue. Authority to let contracts has been decentralized and delegated as much as possible to district engineers, said General Pick, to speed military work.

District offices give to contractors the right to apply a defense-order rating to the materials and supplies needed to complete a specific contract. The present DO-order in use is No. 22 for military construction. So far, said General Pick, this materials priority system has been effective. The trouble comes over construction equipment. DO-order 22 does not cover a contractor's purchase of equipment for his own plant. However, the Corps hopes to apply a very small amount of its dollar priority ceiling to the procurement by contractors of construction equipment. One per cent of the total value of Corps contracts would secure relief for the contractors, said General Pick. The Corps [illegible] to amend the Time Extensions paragraph in contracts. Under the amendment, delays caused by tardy material delivery would be considered as caused "by acts of the Government" and therefore excusable as such.

General Pick concluded by praising the AGC for its contribution to the Organized Reserve Corps' affiliation program. As of January, 75 affiliated units out of a total of 177 in the Engineer troop program were sponsored by the AGC—all of battalion or larger size. Ten of these units have been called into service, and two of the ten are now in Korea.

Navy Shore Support

What the Corps of Engineers is to the Army and Air Force, the Bureau of Yards and Docks is to the Navy. The Bureau's chief, Rear Admiral J. F. Jelley, outlined the Navy shore-support work to be done. The main task, he said, is one of rehabilitating and modernizing existing facilities—dry-docks, shipyards, fuel and ammunition depots, utilities, hospitals, etc. Since the beginning of the Korean conflict, Congress has appropriated about $450 million for Navy public works and $149 million for Navy civil engineering.

As to contracts, the Navy policy has been to handle work by advertising and by competitive bid. The majority of Yards and Docks contracts can still be let that way. Only a few lump-sum contracts have been negotiated so far, and there have been no cost-plus-a-fixed-fee contracts yet. As in the Corps, more authority has gone to field offices; district public-works officers are now authorized to award competitive-bid contracts up to $1 million. When circumstances justify negotiation, DPWO's will be authorized to negotiate locally. The primary objective, said Adm. Jelley, is to get quick action.

(Concluded on next page)

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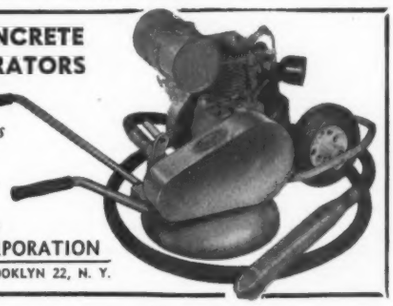

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In three typical applications, shown at the right, these Continuous Threaded Rods are used; (1) to tie form corners; (2) as an anchor rod tie down and as coil bolts; and (3) as a coupling for two coil ties providing an adjustable form tie.

Available in ½", ¾", and 1" diameters and in any length up to 10 ft., Superior Continuous Threaded Coil Rods in quantities can be cut to length on the job with a heavy-duty hand Coil Rod Cutter.

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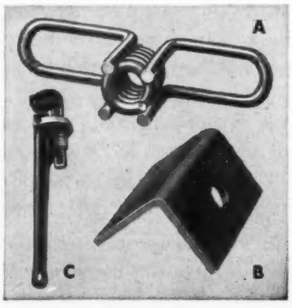

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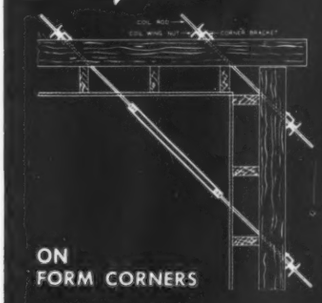
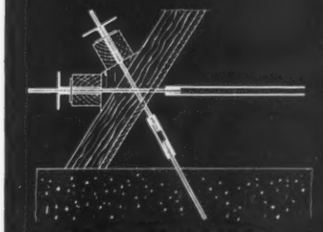


ON FORM CORNERS



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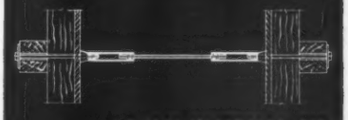

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It contains a valuable table for spacing studs, wales, and form ties.

What's to Be Built In Fiscal Fifty-Two?

(*Continued from preceding page*)

Several Seabee Battalions are overseas, he said—mostly from the Organized Seabee Reserves. But more are needed, including a Volunteer Reserve force in case of full mobilization. Contractors can help, said the Admiral, by spreading the word that the Seabees give petty-officer ratings for the construction experience a man can bring to the Navy.

Reclamation

"I am almost as much in the dark as you are" concerning next year's reclamation construction program, said Grant Bloodgood, Chief Construction Engineer of the Bureau of Reclamation—until Congress acts on the President's budget for the fiscal year beginning next July. It proposes that something like $225 million be approved, one-fourth less than was spent for construction in 1950. What it will be when passed by Congress is anybody's guess; however, power will occupy first place in the 1952 program—that much is sure, he said—with some important irrigation work to be continued.

Whatever the program, reclamation projects as a whole are getting harder to build, he pointed out. "Sites are less favorable, foundations are generally poor, and we must either modify designs to use mediocre local materials or ship suitable materials great distances." Under wartime conditions, these difficulties will be multiplied, of course, by priorities, shortages, restrictions, etc. "It may be", he suggested, "that more study on the part of the Bureau, as well as the contractor, of the experiences during the last war would alleviate some of the headaches we are faced with under the present conditions . . . We hope to be able to minimize disputes and eliminate as much as possible hardships to the contractor or to the public by a proper approach to these problems."

Rural Electrification

Finally, contractors heard from Wade Edmunds, Assistant Chief, Engineering Division, Rural Electrification Administration, that $3 billion worth of new business is in the offing for the construction industry. One billion will be invested by the REA during the next three or four years for the construction of power systems, and the rest for telephone construction to give all farms of the country good telephone service. The REA has approved $3.25 billion in loans during its history, of which $1.75 billion has already been advanced and the rest is earmarked for specific construction jobs. It has about $300 million available for new loans before June 30, and Congress is considering $100 million as its new loan fund for the 1951 fiscal year.

The Government will not be the one to make all or even most of this investment, he said; about 60 per cent of newly electrified farms are served from REA-financed lines, and the same ratio may prevail in the telephone program when it gets going, but "there is going to be a lot of new business . . . we do not know how much of this business will go to contractors. Existing companies have preference under the law for our telephone loans, as do new cooperatives. Some of the borrowers may have their own construction crews, but most of the existing companies now are too small to afford even one full-time employee."

"Already the 3,420,000 electricity consumers on REA-financed lines are demanding power from generators equal in capacity to the entire hydroelectric installations of TVA", said Mr. Wade. In 1950 they used 25 per cent over 1949 and almost 20 times the amount in 1940. By 1955, REA studies show the present demand for power on rural systems will be at least doubled. A lot of new business indeed!

Constructors Association Elects Officers for 1951

The newly elected Board of Governors of the Constructors Association of Western Pennnsylvania has elected as its 1951 President John E. O'Leary, Vice President of the Pittsburgh-Des Moines Steel Co. Mr. O'Leary has served the Association as a member of the Board of Governors, Chairman of the Public Relations Committee, and Vice President of the Heavy Division. He assumed his new post on March 1.

Other officers elected by the Board are Frank O. Patterson, President of the Patterson Construction Co. of Monongahela, who will serve as Vice President of the Highway Division, and Howard H. Sturdy, Vice President and General Manager of the Contracting Division of the Dravo Corp., as Vice President of the Heavy Division. Dan Dinardo, President of Dinardo, Inc., was reelected Treasurer; William R. McQuade, President of James H. McQuade & Sons Co., was elected Secretary; and James A. Nardulli, President of Nardulli & Sons, Inc., is the new Assistant Secretary.

Sonneborn Promotion

Eli Schnapper, with L. Sonneborn Sons, Inc., New York City, for thirty years, has been appointed Manager of Sales Coordination for the Building Products Division of the company.

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A special 22 cubic yard capacity Marion Body with Telescopic Hoists—installed on a tandem semi-trailer.

Hydraulic Hoists Hydraulic Hoists—Through sound engineering and skillful use of high quality materials, Marion has produced a variety of standard and special hoists for efficient dumping service. Marion's extra attention to detail pays off "on the job" in dependable, economical . . . more profitable operation.

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Your near-by Marion distributor can furnish genuine Marion parts and factory "know-how" for your service and repair needs. It pays to deal with an authorized Marion distributor.

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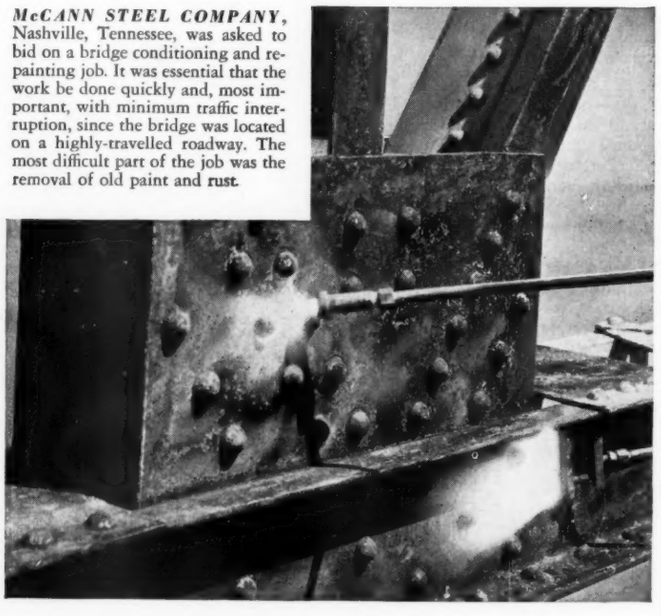
Oxyacetylene Flame Cleaning speeds bridge repainting —without traffic interruption

McCANN STEEL COMPANY, Nashville, Tennessee, was asked to bid on a bridge conditioning and repainting job. It was essential that the work be done quickly and, most important, with minimum traffic interruption, since the bridge was located on a highly-travelled roadway. The most difficult part of the job was the removal of old paint and rust.



F. T. Wilson, Airco technical sales service representative, recommended oxyacetylene flame cleaning to remove scale and old paint prior to repainting. This process, requiring minimum equipment, leaves a warm, clean surface, which is conducive to a long-lasting paint job. Notice in the photograph how the rivet heads are being cleaned with a round tip and the flat surface is being conditioned with a wide flat tip.

The entire bridge was cleaned most satisfactorily, without disrupting traffic too greatly. City officials were very pleased. Bids for reconditioning a second bridge across the Cumberland River will specify the use of flame cleaning.

If you have steel structures exposed to the elements, requiring long-time paint protection, investigate the advantages of Airco oxyacetylene flame cleaning. For technical service or copies of bulletins ADG-1066A, ADG-1067 and ADR-57, describing this process, please write your nearest Airco Office.

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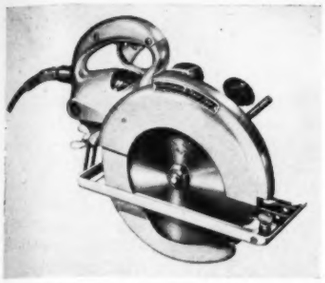

Cummins has introduced two new power saws, the Models 905 and 1000 with 8 and 9⅝-inch blades respectively. This is the Model 1000.

Portable Power Saws

Two power saws designed for heavy-construction jobs and balanced for easy operation are announced by Cummins Portable Tools, Division of Cummins-Chicago Corp., 4740 N. Ravenswood Ave., Chicago 40, Ill. The Model 905 has an 8-inch blade and weighs 19 pounds. It makes a square cut of 2⅝ inches, and cuts through 2¾₁₆-inch lumber at 45 degrees. No-load speed is 3,600 rpm. The Model 1000 has a 9⅝-inch blade and weighs 22 pounds. It cuts 1 inch to 3⅞ inches at 90 degrees, and ¾ inch to 2¹³⁄₁₆ inches at 45 degrees. No-load speed is 3,400 rpm.

Both handle all framing operations on 2-inch rough lumber. Each has a Universal ac-dc motor, 115 volts, 220 volts special; ball bearings throughout; hardened-steel-alloy worm and bronze worm wheel; double pole switch, momentary contact, with lock button; a blower to keep the cut clean; a telescopic type of safety guard with quick return; and a 25-foot 3-conductor cord with a two-prong plug and pigtail connector for grounding.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 875.

Marine-Equipment Catalog

An 18-page catalog about marine equipment for many services has been prepared by Pacific Coast Engineering Co., Oak and Clement Sts., Alameda, Calif. Products tailor-fabricated by Paceco include dredges, dredge tenders, towboats, and barges. The catalog illustrates some of the jobs performed by the company and the services which are available, such as steel fabrication; machine-shop work; construction of deck fittings, masts, and booms; surveys; model constructions; and equipment handling.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 873.

Two American Hoist V.P.'s

John E. Carroll, General Sales Manager of American Hoist & Derrick Co., St. Paul, Minn., has been elected Vice President of Sales, and Robert J. Stoddard, Chief Engineer, has been elected Vice President of Engineering.

Mr. Carroll joined American Hoist in 1937 as a district representative. In 1945 he resigned this sales position to become a partner in Harron, Rickard & McCone Co. of southern California, rejoining American Hoist in 1949 as General Sales Manager. Mr. Stoddard came to American Hoist in 1937 as Assistant Chief Engineer, after having worked for the Tennessee Valley Authority and the American Bridge Co.

Bibliography on Concrete

A subcommittee of the Highway Research Board Committee on Durability of Concrete—Physical Reactions has compiled a chronologically arranged, annotated, and indexed bibliography. Members of the subcommittee were William Lerch, Portland Cement Association; D. W. Lewis, Joint Highway Research Project, Purdue University; and R. C. Valore, National Bureau of Standards. They were assisted by Dorothy Bright, HRB Librarian. References are from 1837 through March, 1950.

Copies of this bibliography may be obtained from the Highway Research Board, National Research Council, 2101 Constitution Ave., Washington 25, D. C. They cost 60 cents each.

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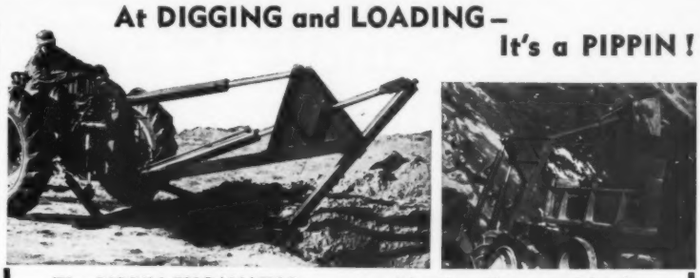

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How to Handle White Compound for Curing

Stirring Is Important; So Is Flushing the Distributor Clean After Use; Spex Suggested for Color, Hiding Power

• SOME practical suggestions about how to handle white-pigmented membrane concrete-curing compounds were offered at the Highway Research Board meeting this year, by C. C. Rhodes of The Testing and Research Division of the Michigan State Highway Department.

Michigan, he said, began using clear or transparent membrane curing compounds in 1942. They were entirely adequate for retaining enough water in concrete to satisfy the hydration needs of cement. But they had one serious drawback: they absorbed too much heat from the sun, and the temperature of the concrete under a transparent membrane rose excessively.

This was dangerous, of course. As early as A. D. 97, the Water Commissioner of Rome, Sextus Junius Frontinus, wrote: "The proper time for masonry work is from the first of April to the first of November; but with this restriction: that the work be interrupted during the hottest part of the summer—for the heat of the sun is no less destructive to masonry than is too violent frost."

Shift From Clear to White

Michigan's survey of 29 projects built during 1946 and 1947, and cured with transparent membrane, showed about three times as many cracked slabs in morning pours as in afternoon. Investigators inferred that half of this premature cracking could have been prevented by effective temperature control. Accordingly, in an attempt to minimize temperature cracking, Michigan shifted to white compounds in 1949. Problems in handling arose almost at once, said Mr. Rhodes, but they were surmountable.

Problems

Michigan's first preliminary test application of white-pigmented compound was on two 100-foot slabs of an experimental pavement at Grand Ledge in 1946. No particular problems developed. A hand-operated orchard sprayer put down a uniform coat at the required coverage rate of 200 square feet per gallon.

However, on a longer 1,500-foot test section north of Port Sanilac, clogged spray nozzles gave a marked ridging in the application. The machine was a hand-operated one furnished by the vendor of the compound, and was pulled forward on the forms after each transverse pass of the spraybar. After the first fairly uniform application, the clogging and ridging showed up, so the investigators removed the clogged straining screens from the nozzles and lifted the spraybar about 6 inches. They also applied the compound by a double pass across the pavement, using a faster transverse travel speed and overlapping half the width of the path laid down by the spraybar on each pass. Results were good. The rate of coverage for the double pass averaged 182 square feet per gallon, and the white membrane weathered away rapidly and uniformly without mottling.

Then came full-scale trials on entire paving projects in 1949, the first on 6.3 miles south of Kalamazoo. The distributor used this time was of the automatic type. The carriage moved forward on the forms continuously, and a single shielded spray nozzle traveled laterally across the pavement. The spray pattern was V-shaped, and each pass overlapped half of the previous one so that the entire surface received a double application.

Everything went along smoothly until it became evident that the valve seats of the machine and the cylinder walls of the reciprocating type of pump used on the distributor were eroding; it was difficult to keep up enough pressure for uniform distribution. Also, the nozzle opening was enlarging from wear, and too much material was being used. The contractor reduced the pressure from 200 psi to 70-90 psi, and the coverage grew lighter—from about 204 to 306 square feet per gallon—and banded.

The pump manufacturer soon solved these problems by using porcelain-lined cast-iron cylinders instead of bronze ones, and a tungsten-carbide orifice insert for the spray nozzle instead of a stainless-steel one.

Two other problems showed up, but a little experience soon corrected them. It became evident that compound left in the circulating system of a distributor damaged pump parts when the machine was again started up. Accordingly a simple and effective way to clean the equipment was devised: circulating about 5 gallons of kerosene through the system several times, by discharging the solvent from the spray nozzle into the original container.

Inadequate stirring of the compound in the drum before and during application also created difficulties. Michigan specified that the compound be shipped in drums with internal agitators; even then, it found that about 20 minutes of hand stirring was necessary. One contractor, noted Mr. Rhodes, developed his own expedient. He made a chuck for a ¾-hp electric drill to fit the agitator shaft, and was able to do an effective stirring job in a few minutes. Another contractor rotated the drum on two sets of supporting rollers turned by a washing-machine motor.

State Develops Spex

Specifications for white-pigmented compounds are in general pretty much like those for clear compounds, Mr. Rhodes pointed out. They should, of course, cover water retention, drying

(Concluded on next page)

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"THE CONTRACTORS' SPECIAL SCALE"

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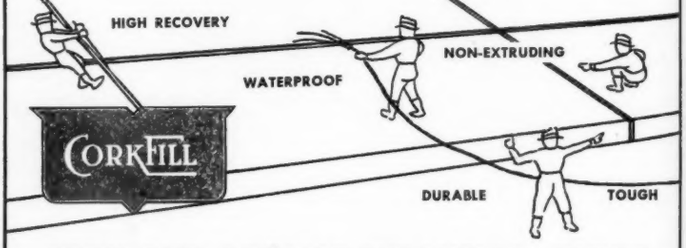
PREVENT PAVEMENT BLOW-UPS



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Outstanding joint efficiency—completely free of maintenance problems—and amazingly easy to install are just a few of the reasons why engineers over the nation recommend Corkfill Expansion Joints. W. R. Meadows, Inc., pioneers in asphalt and fibre joints, now introduce this new cork and asphalt composition expansion joint that greatly outperforms other joint materials where resiliency and non-extruding properties are desirable.

Blow-ups, spalling and other pavement maintenance problems are minimized with Corkfill joints. Corkfill has a high recovery of over 85% as against 70% for fibre joints. By comparison it is highly waterproof, light in weight; it has a high tensile strength making it less subject to breakage when installing. Approved by U. S. Engineers and Navy Department as well as under AASHA Specifications M-59, Type VI. Most State Highway Departments accept Corkfill under current fibre joint specifications. Samples and prices are available on request. See your Sealtight Distributor today.

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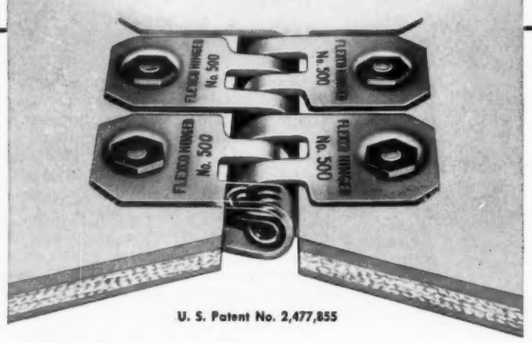
FLEXCO HINGED
BELT FASTENERS



U. S. Patent No. 2,477,855

For joining grader, trencher, ditcher and other earth moving conveyor belts.
For belts ⅜" to ½" thick.
A FLEXCO fastener that is HINGED. Has removable hinge pin.
Troughs naturally, operates through take-up pulleys.
Strong, durable . . . pull or tension is distributed uniformly across joint.

Order From Your Supply House. Ask for Bulletin HF 500.
FLEXIBLE STEEL LACING CO. 4608 Lexington St., Chicago 44, Ill.

time, adherence to moist concrete, settlement, and reactivity with cement. However, three more details should be specified: color or degree of whiteness, hiding power, and provision for adequate stirring.

Color, which determines heat absorption, should be carefully evaluated. The membrane should be as good a reflector as possible to minimize heat absorption, and since whiteness is a general indicator of this property, the color should approach a perfect white. Michigan has adopted a minimum apparent reflectance value of 70 per cent relative to magnesium oxide. The figure is purely arbitrary, Mr. Rhodes pointed out, but represents a good compromise between efficiency and cost of the compound.

As to hiding power, Michigan spex require that the compound cover a test black-and-white checkerboard when applied at the rate of 100 square feet per gallon. The State has found that compound meeting this rigorous test specification masks concrete surfaces effectively in the field when applied at the rate of 200 square feet per gallon.

As already mentioned, Michigan also specifies that shipping containers contain efficient agitators. If the compound is not pumped directly from the shipping drum, the distributor tank must carry some sort of stirring apparatus to give thorough mixing after interruptions, shutdowns, or overnight standing.

Acceptance Tests

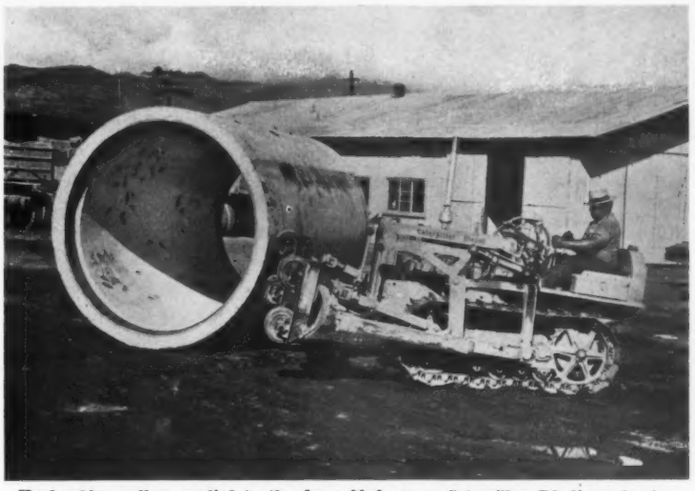
Michigan uses ASTM procedures wherever possible to test its compounds The checkerboard test of hiding power, already mentioned, gives satisfactory results, said Mr. Rhodes, and is easy to perform.

The State's color test employs a spectrophotometer. Apparent luminous reflectance as defined in ASTM Method D 307 is obtained by measuring the comparative reflection of radiant energy by the sample and magnesium oxide standard at 20-millimicron intervals of wavelength of the incident light through the range of 400 to 700 millimicrons. The apparatus is set up for 45-degree illumination with perpendicular viewing. The light source is a single General Electric No. 4560 sealed-beam lamp operating at 28 volts with a maximum intensity of 600,000 candlepower at beam center. The essential requirements for the illuminant are that its spectrum be continuous and its intensity be such as to produce adequate galvanometer response at each wavelength of the test. Computations follow the ASTM procedure for calculating the luminous apparent reflectance R_o in per cent.

Michigan is also working on a simplified color-test unit based on reflection measurements at three wavelength bands of the spectrum through the use of red, green, and blue filters.

Mr. Rhodes concluded: "There are definite indications that white-pigmented compounds are doing the job for which they were intended. The problems encountered have not been serious, and have been solved by mutual cooperation of equipment manufacturers, contractors, vendors of the compound, and the Highway Department."

More scrap metal is needed again to maintain and increase high steel output. Everyone must help, so put your scrap to work, for more steel.



Hard rubber rollers applied to the dozer blade on a Caterpillar D2 diesel tractor handle heavy concrete pipe sections for the Hawaiian San Island Sewer Outfall. Hawaiian Dredging Co., Honolulu, is working on the job. When the pipe has been pushed to a wharf, it is loaded onto a barge and towed out to the dredging site.

SUPER SEAL

Gives BLACKTOP *a future!*

This simple, inexpensive, yet highly successful method makes "an almost unbelievable difference."

The functions of SUPER SEAL are:—

PROTECTION: Against water, sun's ray, frost, solvents, etc. It seals these damaging influences completely out of pavement. Prevents oxidation.

PRESERVATION: Seals the life, vitality of pavement in. SUPER SEALED pavement CANNOT deteriorate, dry out or become troublesome.

BEAUTIFICATION: Improves greatly on the surface through smoothness, ease of maintenance and general appearance. Much nicer for all concerned.

SUPER SEAL results in:

- A much wider, greater demand for asphalt pavement! Makes it much more acceptable, desirable.
- The elimination of competitive bidding!
- Opening up heretofore unknown possibilities!
- Not only brings blacktop up to date and gives it a bright future, but also assures costractors who use it, respect, prestige and advancement. A top-notch business builder.

Full particulars and sample available on request. (Also driveway colors, accessories.)

TROYER DRIVEWAY TOOLS

Seal-coat Pioneers, Specialists, Distributors

2157 So. Park Ave. Buffalo 20, N. Y.

Some choice dealership territories open

Here's the POWER you want on your job... plus DEPENDABILITY

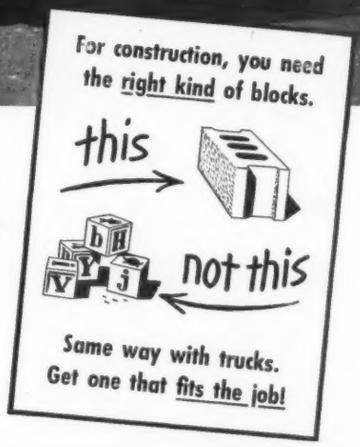
Whether you're hauling dirt, spreading asphalt, or doing one of many other rugged jobs, you want a truck that fits the job—and provides plenty of low-cost power. Such a truck is a Dodge "*Job-Rated*" truck.

New Dodge "Job-Rated" trucks provide more power than before. On 2½-ton models, for instance, Dodge now offers a new 114 hp engine . . . the most powerful Dodge engine ever available in that field. And on high-tonnage models twin carburetion and exhaust system gives you plenty of extra power with extra economy.

And talk about maneuverability! Shorter turning diameters and new worm-and-roller steering gears on many models make the new Dodge "*Job-Rated*" trucks far easier to handle.

If it's dependability you're after, (and who isn't?) you'll go for features like the new Dodge moistureproof ignition and the new high-torque capacity starting motor. They help make starting easier in bad weather.

There's a Dodge "*Job-Rated*" truck to fit your need *exactly*. Get the proof from your nearby Dodge dealer today.



DODGE "Job-Rated" TRUCKS

How Dodge Trucks are "Job-Rated" for the Construction Business

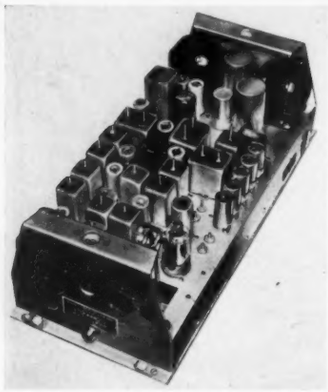
A Dodge "*Job-Rated*" truck is engineered *at the factory* to fit a specific job . . . save you money . . . last longer.

Every unit from engine to rear axle is "*Job-Rated*"—factory-engineered to haul a specific load over the roads you travel and at the speeds you require.

Every unit that SUPPORTS the load—frame, axles, springs, wheels, tires, and others—is engineered right to provide the strength and capacity needed.

Every unit that MOVES the load—engine, clutch, transmission, propeller shaft, rear axle, and others—is engineered right to meet a particular operating condition.

"Job-Rated" TRUCKS DO THE MOST FOR YOU



The Radiopak is a single-unit transmitter-receiver for mobile communication in the 152-174-mc band. It operates from the regular 6-volt electrical system of any vehicle.

New Radio-Telephone A Mobile Single Unit

A single-unit transmitter-receiver for mobile communication in the 152-174-mc band has been announced by Kaar Engineering Co., Middlefield Road, Palo Alto, Calif. The Radiopak is of a compact single-chassis design.

Its power output is 10 to 12 watts. Battery drain is said to be 6½ amperes during standby and 15 during transmitting periods. The equipment will operate satisfactorily from the regular 6-volt electrical system of any vehicle, the manufacturer says. It is 6¾ inches high overall, 8 inches wide, and 18⅛ inches long; it weighs 24 pounds, including dust cover.

According to the manufacturer, the Radiopak is designed for simplicity of installation, maintenance, and operation, and features stability, sensitivity, and selectivity that exceeds the standards set by FCC regulation. Kaar states that these features have been developed without sacrificing rugged construction and ability to withstand extreme temperature changes. The company also manufactures complete central-station equipment for the 152-174-mc band.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 948.

Name-Plate Decals Save Hand Lettering

Decals for lettering or decorating trucks, tractors, and other construction equipment may be obtained from Chicago Decalcomania Co., 3310 Elston Ave., Chicago 18, Ill. Weather-tested nonfading, synthetic-enameled and lacquered decals will wear as long as the body paint on your equipment, the company claims.

The decals can be applied with varnish or water. Any special style of lettering or pictorial design can be faithfully reproduced with no limitation of color or size, the company says; its art department will submit color sketches and create ideas for consideration.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 925.

Ryerson Promotes Fennie

John R. Fennie is now managing the Tubular Products Department of the Los Angeles branch of Joseph T. Ryerson & Son, Inc., Chicago, Ill. He has been a member of the Ryerson sales staff since 1946. In his new position he heads the department responsible for merchandising tubular products including seamless and welded mechanical tubing, pressure tubing, hydraulic-cylinder and line tubing, and structural tubing.

Rubber Paving Materials

The billion-dollar frost damage to the nation's roads and highways during the past winter makes each and every plan for combating frost of interest to highway men. One suggestion is the use of a rubber compound in asphalt mixtures for paving surfaces. The benefits claimed for this process are fully outlined in a new catalog prepared by The Firestone Tire & Rubber Co., Akron 17, Ohio. Rub-R-Road paving mixtures are said to increase the durability of the road and its resistance to frost damage, and to provide increased traction. Catalog photos show the method of preparing and laying the wearing surface. Also illustrated are various applications on streets, roads, playgrounds, tennis courts, etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 930.

CONCRETE TRUCK MIXERS • LOW IN COST • LESS TO OPERATE

Power take-off from Truck transmission *operates* Mixer

...also obtainable with separate Engine Drive

Hi-Lo TRUCK MIXERS
HI-LO & HI-LO Jr.

HI-LO Jr.

✓ Rugged Construction ✓ Light Weight ✓ Speed

VISIBLE MIXING ACTION . . . Revolving Blade Action continuously kneads, folds and blades — prevents segregation, discharges a homogeneous mix fast or slow as desired.

"Ask the Fleet Owner" New LITERATURE on Request

2½ CUBIC YARD MIXER — 3½ CUBIC YARD AGITATOR

Look for the Rating Plate

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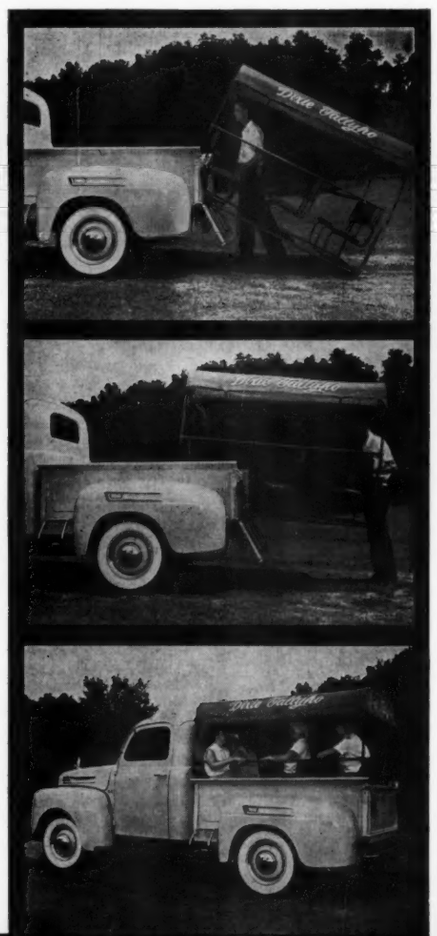
Phone Flanders 7800
4984 FYLER AVE., • ST. LOUIS 9, MO

Serving the CONCRETE INDUSTRY 20 YEARS

IT'S SENSATIONAL!

Dixie Tallyho
MAKES LOWEST COST STATION WAGON IN THE WORLD!

Ideal for transporting war plant workers, industrial personnel and farm labor



UTILITOP

Here's the answer to converting an open pick-up truck into a low cost "panel delivery" truck. Fits any ½ ton model. Weatherproof and safe. Protects equipment, provisions, etc., from weather.

Dixie Tallyho fits any half ton pick-up truck snugly. It's rugged and durable. Has heavy canvas sides that zipper close for weather tightness and top reinforced with hardwood slats. Comfortable spring action seats. Sides have plastic windows which won't crack or break.

Ideal for contractors, lumbermen, farmers, mining operators and all industries which need a low cost, safe, comfortable means of transporting labor.

DEALERS WRITE FOR FRANCHISE — YOUR TERRITORY TODAY. DIXIE TALLYHO IS IN GREAT DEMAND EVERYWHERE.

Write today — DIXIE TALLYHO, Inc., Fairburn, Ga. Phone 6411

LIGHT WEIGHT • ONE PERSON CAN LOAD OR UNLOAD IN ONE MINUTE OR LESS

The new Comfort sprayer works at pressures from 0 to 300 pounds. Attachments are the Comfort high-pressure spray gun and the Boom Jet single or double nozzles.

High-Pressure Spray

A self-contained unit for spraying at pressures from 0 to 300 pounds is announced by Comfort Equipment Co., Kansas City 8, Mo. It is designed for easy attachment of the Comfort high-pressure spray gun of the Boom Jet single or double nozzles. The gun and Boom Jet attachments are sold individually or together with the unit, depending on requirements. According to the manufacturer, the double Boom Jet unit is capable of a maximum spray pattern 52 feet wide at 60-pound pressure with nozzles set at a 4-foot height.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 940.

Johns-Manville News

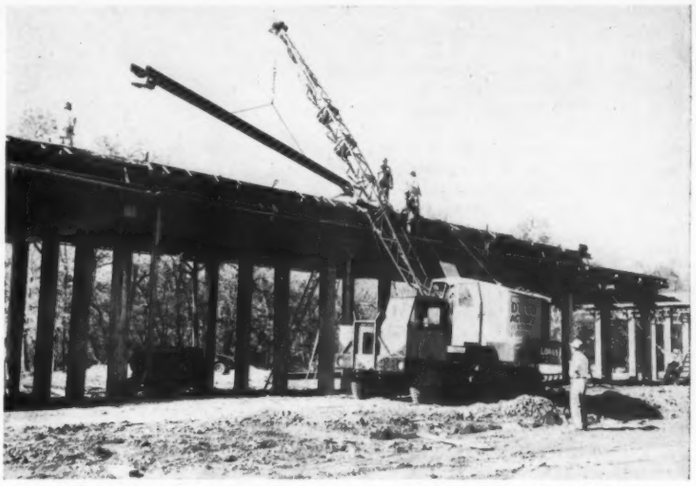
E. K. Clark is now Vice President of Johns-Manville Sales Corp. and Merchandise Manager of the company's Building Products Division. Earnest M. Fuller succeeds him as Manager of the Construction Department.

Mr. Clark joined Johns-Manville in 1934 as an architectural representative in the Boston District. He was made Manager of the Construction Department in 1944. Mr. Fuller came to the company in 1930 as an acoustical engineer in the Chicago District office. In 1945 he became Assistant Manager of the Construction Department with headquarters in New York.

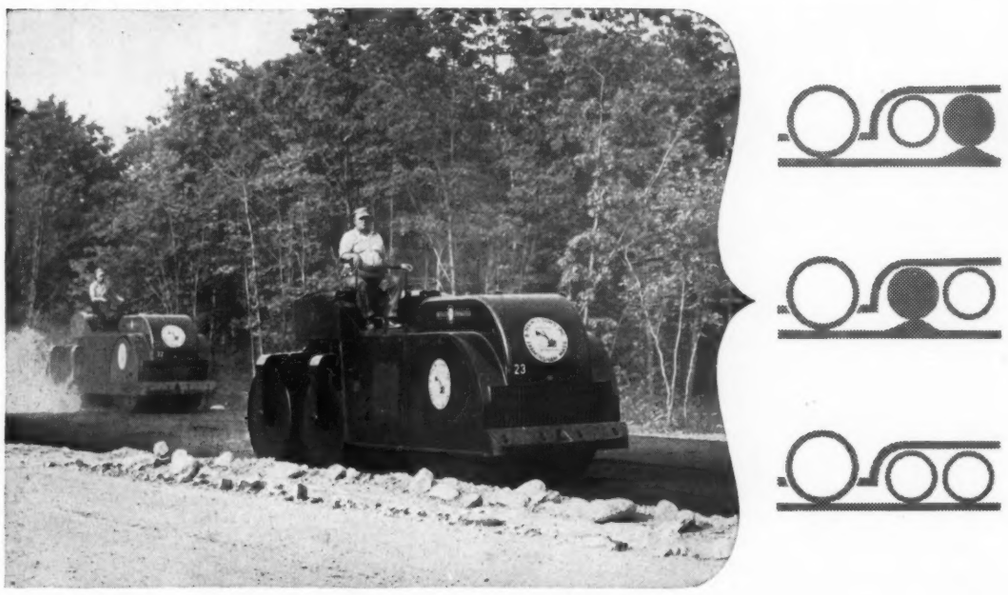
Soil-Testing Apparatus

A new illustrated bulletin introducing a number of new items of soil-testing equipment is now available from Soil Testing Services, 4520 W. North Ave., Chicago 39, Ill. It covers both laboratory and field apparatus. A few of the products listed are the Harvard miniature compaction apparatus, plastic and liquid-limit sets, triaxial apparatus, pore-pressure apparatus, consolidometers, consolidation apparatus, penetrometers, samplers, scales, and ovens.

This new bulletin is available from the company by requesting Catalog 3-51, or by using the Request Card at page 16. Circle No. 927. Information is also available on other new items not listed in the bulletin, and the company requests that interested persons contact them directly concerning any type of soil-testing apparatus.



This 1,200-foot-long bridge—one of five with a combined length of 2,800 feet—will complete a section of Texas State Highway 488. F. S. Oldt Co. of Dallas used this Lorain TL Moto-Crane all over the job for material handling. Here it lifts a 2,500-pound screed into place.



What is 3-AXLE SMOOTHNESS?

The answer to this question is a matter of record. By actual test, it is the highest degree of road surface smoothness ever attained with tandem roller. A leading state highway department proved that the Buffalo-Springfield 3-axle tandem produces surfaces 50% smoother than the average obtained with conventional tandems of equal capacity. Also noteworthy, the same test showed that the 3-axle tandem averaged 60% more tonnage compacted than other units on the project. As a result, the specifications for asphaltic surfaces in this state now permit the use of one less tandem roller with each spreader, *provided* a 3-axle tandem is one of the rollers employed.

Still another state specifically requires the use of a 3-axle tandem on certain plant mix surfaces.

There's a reason for this greater work capacity and smoother rolling results. The two large diameter guide rolls and the drive roll of the 3-axle tandem are rigidly mounted in a position tangent to the same plane. Thus, when one guide roll strikes a high spot in the pavement, the other is lifted clear of the surface and its weight transferred to the rolls retaining surface contact. Result—maximum compactive effort where it is needed most—on the high spots in the surface.

You can learn more about this transfer-of-weight principle and the many other exclusive features of the Buffalo-Springfield Model KX-25, 12 to 19 ton, 3-axle tandem from your nearest distributor. Why not call him today?

Mail This Coupon Today

THE BUFFALO-SPRINGFIELD ROLLER CO.
Dept. G-5, Springfield, Ohio

☐ Please send me Catalogue S-56-49 describing the right model for my requirements.
☐ Notify Distributor to call.

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BUFFALO SPRINGFIELD
THE STANDARD OF COMPARISON
SPRINGFIELD, OHIO

"UNTOLD Savings IN money"

By the use of

ATLAS SPEED FORMS

"We have been able to effect substantial savings in the time . . . to set up . . . and . . . tear down, which means untold savings in money."

HOWARD C. GRUBB,
Building Contractor
Tulsa, Oklahoma

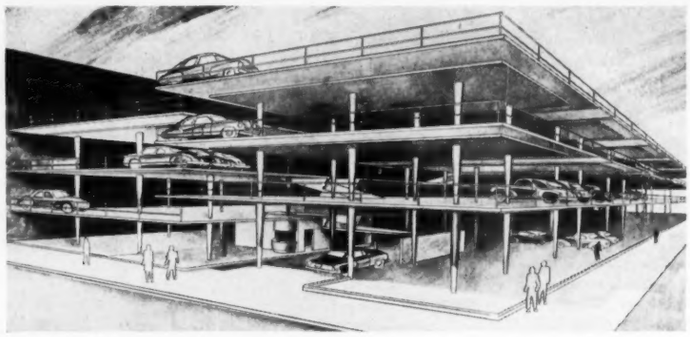
IRVINGTON FORM & TANK CORP.
Irvington 39, N. Y.

Send more information. I am interested in forms for.....
Name.....
Firm.....
Address.....

Unit-Building Principle In New Orleans Garage

The principle of unit building—the repetition of indentical parts throughout a structure—was used in the construction of a New Orleans open-deck parking garage described by L. G. Farrant and W. C. Harry, consulting engineers, Miami, Fla., at the 47th Annual Convention of the American Concrete Institute held in San Francisco last February.

The thirty units used in the garage resemble a set of tables resting on each other. The flat slabs allow space for parking as well as for the horizontal movement of cars, and a ramp between the building units gives access to the parking space. The cantilevers which overlap in the center of the building develop large moments in the columns, and a tapered column hinged at the base was used to eliminate the need for large supports. This reduced the moment in the columns, maintained the nature of the unit building, and provided a maximum amount of parking space.



A New Orleans parking garage uses the principle of unit building, or the arrangement of identical parts so that the completed structure is composed of a repetition of the same units—like a set of toy blocks.

The garage cost $400 per car exclusive of property values. Construction economy was possible because concrete did not have to be placed continuously but could be carried from one unit to another and one slab to another. There was a maximum of standardization and re-use of forms. New-style high-bond reinforcing bars which eliminated the use of hooks and lowered anchorage requirements reduced the amount of steel necessary.

Data on Sand-Dewatering And Classifying Machines

A new broadside describing the Conveyco vacuum sand-dewatering and classifying machine has been issued by The Conveyor Co., 3260 E. Slauson Ave., Los Angeles 11, Calif. The machine gives fast drying and clean sand, it has a large capacity, and it lowers handling costs, the company explains.

The literature points out that each machine is self-contained and includes drive motor, return-water pump, motor, and turbine air compressor. The capacity and dryness required determine the size of the machine. The operator can set the speed of his unit for either maximum dryness or maximum capacity.

Diagrams show how the unit works. The broadside also explains how the machine's speed-controlling feature makes it adaptable for small or large-plant operation.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 871.

Use of Hydraulic Controls

A new 8-page booklet on hydraulic controls is offered by Caterpillar Tractor Co., Peoria, Ill. It explains in detail how the company's three models of hydraulic controls fit the various models of Caterpillar track-type tractors, and it tabulates arrangements needed to adapt the No. 44 hydraulic control to either the D2, D4, or D6 tractors. It includes complete specifications for all three controls.

Several pictures indicate the types of jobs to which these controls are suited. Pictorial cutaways show the construction and operating features of the controls and the hydraulic jacks. An explanation of "hydraulic balance" in the vane-type pump shows why the feature is so important to long and trouble-free pump life.

This literature may be obtained from the company by requesting Form 30046. Or use the Request Card at page 16. Circle No. 988.

How to Resurface Concrete

A 16-page booklet on concrete resurfacing for old pavements is available from the Portland Cement Association, 33 W. Grand Ave., Chicago 10, Ill. It contains an outline of the essentials for good resurfacing and illustrates the results with photos of jobs throughout the country. It explains both thin resurfacing and complete overhaul of the road. Recommended design and suggestions for job procedure are included.

This literature may be obtained from the Association, or by using the Request Card at page 16. Circle No. 934.

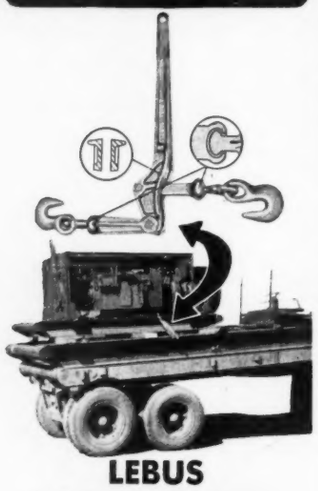
Rebuilding Dipper Teeth

Methods of rebuilding and repairing worn dipper teeth are fully described in the latest "Manganal Marketer" (Vol. 2, No. 9), available upon request from Stulz-Sickles Co., 134 Lafayette St., Newark 5, N. J.

Facts about where and how to use patented Manganal 11 to 13½ per cent manganese-nickel steel products to salvage worn dipper teeth are presented in detail, with illustrations. Dipper teeth repaired with Manganal often outlast new ones, the company points out. Manganal is the toughest metal known, says the manual—not harmed by heat. It work-hardens up to 550 Brinell under impact and abrasion; has a tensile strength up to 150,000 psi. Hot-rolled or cast wedge bars are available in 23 sizes to fit any worn tooth and minimize build-up welding time.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 856.

OVER . . .
HALF MILLION
IN USE
Throughout the
WORLD



LEBUS
LOAD BINDERS
GUARANTEED
FOR LIFE

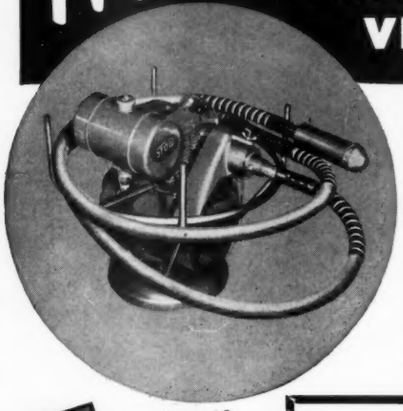
In five years over 500,000 LeBus Load Binders have been sold throughout the world and only 600 have been returned due to breakage or faulty materials. Each of those few returned have been replaced free of charge. This guarantee can only be made because of the high quality workmanship and materials which go into LeBus load binders. These Load Binders are drop forged of alloy and high carbon steel then machine fitted and heat treated after forging for strength and durability. They are manufactured in five sizes.

"WHEN YOU BUY LeBUS TOOLS, YOU BUY STRENGTH, DURABILITY, AND TOPS IN SERVICE . . ."

LEBUS
BUY FROM YOUR SUPPLY STORE

LEBUS
ROTARY TOOL WORKS
INCORPORATED
P. O. Box 2352 L. D. Ph. 5
LONGVIEW, TEXAS

New! A COMPLETE LINE OF STOW GASOLINE AND ELECTRIC VIBRATORS



SUPERIOR PERFORMANCE — thru improved design; higher operating speeds; lighter weight, heavy duty flexible shafting; shorter, more efficient vibrator heads.

MORE UTILITY — new STOW design permits tool shafts to be quickly, easily attached to the engine shaft for grinding, buffing, drilling. Complete accessories available.

THE RIGHT VIBRATOR FOR THE JOB. You'll find just the unit you need in this newly designed, complete line!

Send for Bulletin 511
Catalogs all STOW vibrator models and accessories. Gives performance data. Write today for your FREE copy

STOW
MANUFACTURING CO.
40 SHEAR STREET BINGHAMTON, N. Y.

now!
COMBINES:
D-P
DISPERZO PLUS CERAMID
TRADE MARK REGISTERED

A Modern Air Entrainer Incorporating a Hardening Agent

Some Advantages of D-p

D-p is the only air-entraining agent containing CERAMID. While D-p compares with the best air-entrainers marketed, it also provides Miracle Finish; Harder, Smoother and More Water Resistant Surfaces. Many advantages are obtained by the use of D-p in concrete placement, concrete finishing and concrete products manufacture.

Of major importance among the advantages of DISPERZO, is the correct amount of entrained air, less segregation of aggregate, reduced bleeding by better dispersion of cement and water, increased compression factor, improved workability and INCREASED CUBIC YARD PRODUCTION.

Of major importance among the advantages of CERAMID is more hardness, more water resistance, smoother finish, richer color, slower cure and reduced scaling.

D-p is a liquid—Easy to Use. D-p is stable—Safe to Use.
D-p is flexible—Affords control of entrained air.
D-p IS PROFITABLE TO USE!

PRICE: $1.25 per gallon, total freight allowed East of Rocky Mountains.
Freight equalization West of Denver.
TERMS: 30 days net to Rated Concerns.

ATLANTIC CHEMICALS, Inc.
P. O. Box 3466
ORLANDO, FLORIDA

There are no gears, cranks, or rods in the Skil Model 437 electric hammer, and it delivers 3,600 blows a minute.

New Portable Hammer

A new portable electric hammer with only one working part has been announced by Skilsaw, Inc., 5033 Elston Ave., Chicago 30, Ill. It incorporates a specially designed power unit consisting of two alternately energized magnetic coils, eliminating gears, cranks, and connecting rods.

Striking 3,600 blows a minute, the Skil Model 437 electric hammer is said to handle all types of work—drilling and channeling in concrete; vibrating concrete forms; chipping, scaling, and cleaning of many materials; etc. The contour-grip handle is designed for easy holding during long use.

This 1⅛-inch hammer has a normal operating range of ¾ to 1⅛-inch-diameter star drills and extreme operating limits of ⅜ to 1½ inch-diameter star drills. It is 16¼ inches long and weighs 20 pounds. The steel carrying case contains a built-in selenium rectifier, 15 feet of rubber-covered extension cord, 3 star drills, and other equipment for general use. A complete line of accessories is available to increase the versatility of the tool.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 991.

New Warning Lantern

A new safety lantern said to project a "pencil beam" signal visible at great distances has been introduced by R. E. Dietz Co., 225 Wilkinson St., Syracuse 1, N. Y. The fresnel globe, moulded with optically correct prisms in echelon, is scientificially designed to concentrate the light rays so as to project them in a parallel, vertical beam of great intensity, the company says.

Feature of the Night Watch is the trip lock to release the chimney. A flip of the finger and the globe can be lifted for lighting, for cleaning, or for trimming the wick. Pressing the chimney down lightly locks it automatically.

Feature of the Night Watch safety lantern is a trip lock that releases the chimney so the globe can be lifted out when necessary for lighting, cleaning, or trimming the wick.

The lantern is equipped with a bail handle and is yellow. The fresnel globe is red. The 16-ounce capacity is said to provide 100 burning hours. The lantern is 8 inches high with a 6¾-inch diameter at its non-tip base.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 915.

Hyster Expands by a Third

Hyster's manufacturing capacity will be increased at least one-third by enlargements at the company plants in Portland, Oreg., and Peoria and Danville, Ill. The assembly building in Portland is being extended at the east and west ends to provide more space for present assembly equipment and centralization of the plate shop. A new building is under construction south of the present Peoria plant. The plate shop in Danville is being extended to cover a spur of the New York Central railroad and the plant's machine shop will be moved to a new building.

HERE'S A FASTER, EASIER, CHEAPER WAY TO HANDLE MORE DIRT, ROCK OR GRAVEL!

OMAHA STANDARD TRAILERS

The OMAHA STANDARD "CENTER DUMP" Trailer . . .

. . . Custom Built to Job Requirements is designed for contractors who want to haul dirt, gravel, rock, long or short distances, quickly and at low cost, for stock piling, spreading or dumping. Contractors say it is just what they have been looking for!

★ Each unit built to job requirements.
★ Available in sizes and lengths to meet all bridge and axle laws.
★ All *steel welded* body, chassis. Built to withstand roughest loading, toughest service.
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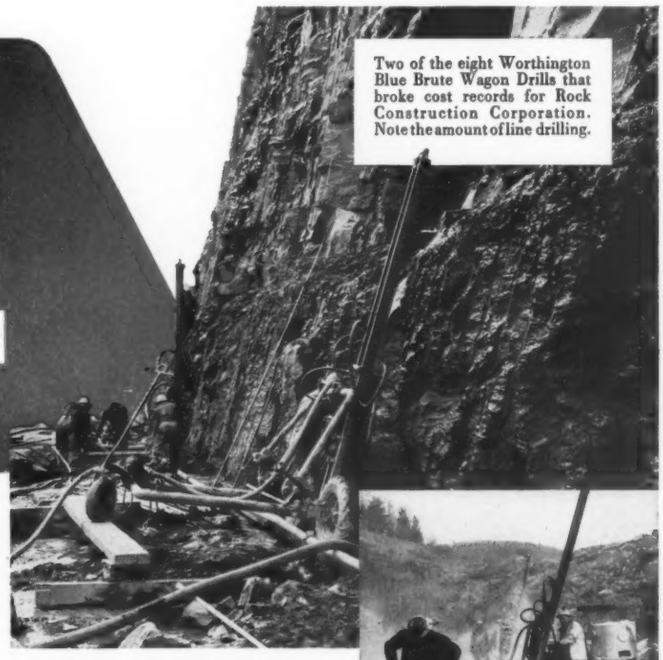

Two of the eight Worthington Blue Brute Wagon Drills that broke cost records for Rock Construction Corporation. Note the amount of line drilling.

President Walt Dunham and Engineer A. Bruce Lattanzi in the company's Downsville Dam office.

Two 500¹ Worthington Blue Brute Air Compressors supplying air for drills at the Downsville Dam.

Worthington Blue Brute Rock Drill operating ahead of the wagons collaring hole for laying out line drilling.

Line drilling in blue stone is child's play to those Worthington Blue Brute Wagon Drills.

Rock Construction Corporation of Kingston, New York, working on the Downsville Dam weir and waste channel, got service out of eight wagon drills that constantly amazed them.

Walt Dunham, president, reported: "We have drilled as much as 700-800 feet per 8-hour day per machine. In 165 working days, the machines put out 300,000 cu yds with so little maintenance it can't be figured in cost per yard."

This job also used a number of Worthington Blue Brute Hand-Held Rock Drills. Says Mr. Dunham: "There has been absolutely no maintenance cost. Our operators like them better than anything they have ever used."

Contractors everywhere know that a Worthington Blue Brute team—air compressor and tools—makes mincemeat out of even the toughest jobs. See your nearby Worthington distributor for a demonstration. Worthington Pump and Machinery Corporation, Construction Equipment Division, Dunellen, N. J.

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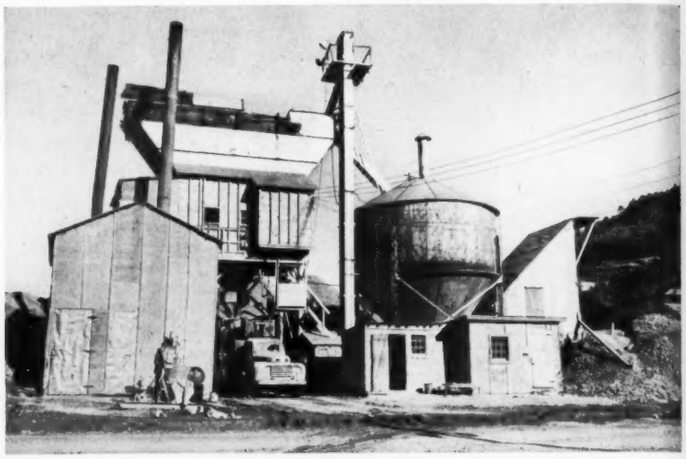
Downsville Dam Will Form the



Concrete batches for the cutoff wall and, later, for the gap closing came from this Butler plant. A Ransome truck mixer, Ford-mounted, is picking up cement and aggregate.

Rolled-Embankment Contract Under Way, With All Material Processed Over a Grizzly; Will Augment Water Supply

By WILLIAM H. QUIRK,
Eastern Editor

(Photo on page 1)

• NEW YORK CITY'S 7,841,023 residents (1950 census) consume an average of 1,200,000,000 gallons of water every day. The present dependable supply is 1,040,000,000 gallons a day from:

Wells, Long Island and Staten Island	100,000,000 gals.
Croton Watershed	325,000,000 gals.
Catskill Watershed	525,000,000 gals.
Roundout Watershed	90,000,000 gals.
Total	1,040,000,000 gals.

During a drought period like the year 1949 and early 1950, the vast storage capacity of the reservoirs was drawn on to a critical state of depletion.

The city's Board of Water Supply was far from unmindful of the increasing demands for water, and long ago had planned to move west of the Hudson River watershed divide, and tap the resources of the upper Delaware River, not far from the Pennsylvania border and about 100 miles from New York City. The Board planned to have two new reservoirs on the east branch of the Delaware available by 1945, thus keeping well ahead of the growing need for water. Construction got under way in 1941 on this $440,000,000 project, but World War II soon halted the work. Material shortages after the war caused further delay, with the obvious result that this new source of water will not be available until 1955 at the earliest—a decade behind the original schedule.

To meet the present water-shortage emergency, the Board of Water Supply is tapping the Hudson River directly. For needs up to 1960 the Board is planning another reservoir on the Delaware, this time on the west branch near Cannonsville, N. Y. This latter project is in line with the program of Incodel—Interstate Commission on the Delaware River Basin—which has brought out a master plan covering the sections of New York, Pennsylvania, New Jersey, and Delaware served by the basin area. Future New York City water demands, up to the year 2000, will be satisfied through similar cooperative planning of neighboring states, which are fully cognizant of the necessity of conserving the available water resources.

Three Dams

The three latest dams for the New York City water-supply system are the Merriman, Neversink, and Downsville. Merriman Dam forms Roundout Reservoir in the Hudson watershed. Located near Lackawack, N. Y., it was completed in 1950 and has an available ca-

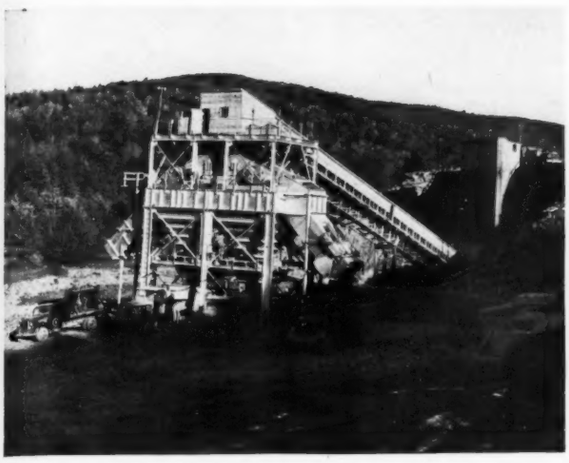
(Continued on next page)

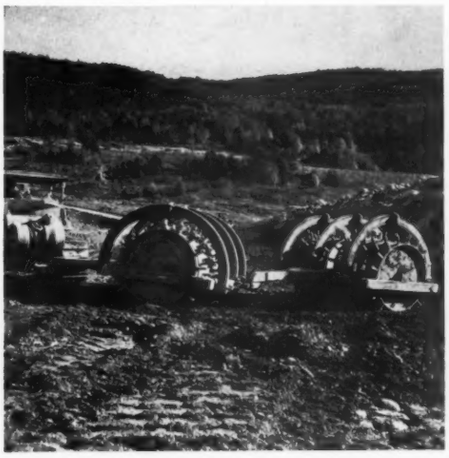
Above: A concrete cutoff wall forms the core of Downsville Dam across the east branch of the Delaware River. Six large gaps about 45 x 80 feet were left in it so earth haulers could move around more easily. Here, under a later contract, workmen close one of the gaps with concrete. A Lorain truck crane handles the bucket.

C. & E. M. Photos

Right: The dam will stretch 2,450 feet across the river valley, its core wall climbing the abutments to a top grade of 1,280. The wall will be encased in rolled-fill embankments of processed material. This view was taken from the south abutment. The downstream side of the dam is to the left.

Largest New York City Reservoir





All dam embankment material went over a grizzly. At left above, a Robins grizzly removes plus-5-inch stones from class A impervious material. In the middle photo, Southwest sheepsfoot rollers compact class B pervious fill. At right, a Barco Pegson Rammer tamps backfill along the cutoff wall.

pacity of 49,000,000,000 gallons. The 85-mile Delaware Aqueduct connects Roundout Reservoir with the Croton water supply. Neversink Dam at Neversink, N. Y., is in the Delaware watershed. It forms the Neversink Reservoir which, on completion in 1952, will store 36,000,000,000 gallons. S. A. Healy Co. of White Plains, N. Y., is constructing this dam. Water from Neversink Reservoir will flow into Roundout Reservoir through a tunnel 5 miles long x 10 feet in diameter, now being built by Frazier-Davis Construction Co. of St. Louis.

Pepacton Reservoir, the largest of the three, will be formed by the Downsville Dam, Downsville, N. Y., on the east branch of the Delaware River. Unlike the other two structures, work on Downsville Dam did not get under way until after World War II, and it is expected to go into service some time in 1955. The reservoir will have a maximum length of 18 miles, with a storage capacity of 143,500,000,000 gallons. It, too, will be connected to Roundout Reservoir through a 25-mile tunnel, 11 feet 4 inches in diameter.

All three dams have a maximum height of 200 feet above the stream bed. Merriman Dam is 2,500 feet long, Neversink Dam 2,800 feet, and Downsville 2,450 feet, measured at the crest. Together the three reservoirs will have a dependable yield of 540,000,000 gallons a day. The dams are fairly similar, with concrete cutoff walls for a core, encased in rolled-fill embankments built with processed material. River flow was blocked off with upstream dirt cofferdams incorporated within the toe of the embankment, and the water diverted through tunnels holed out of the rock in one of the abutments. At all locations, bedrock beneath the valley overburden furnishes a suitable foundation. Spillway-overflow waste channels are cut into the rock above the diver-

(Continued on next page)

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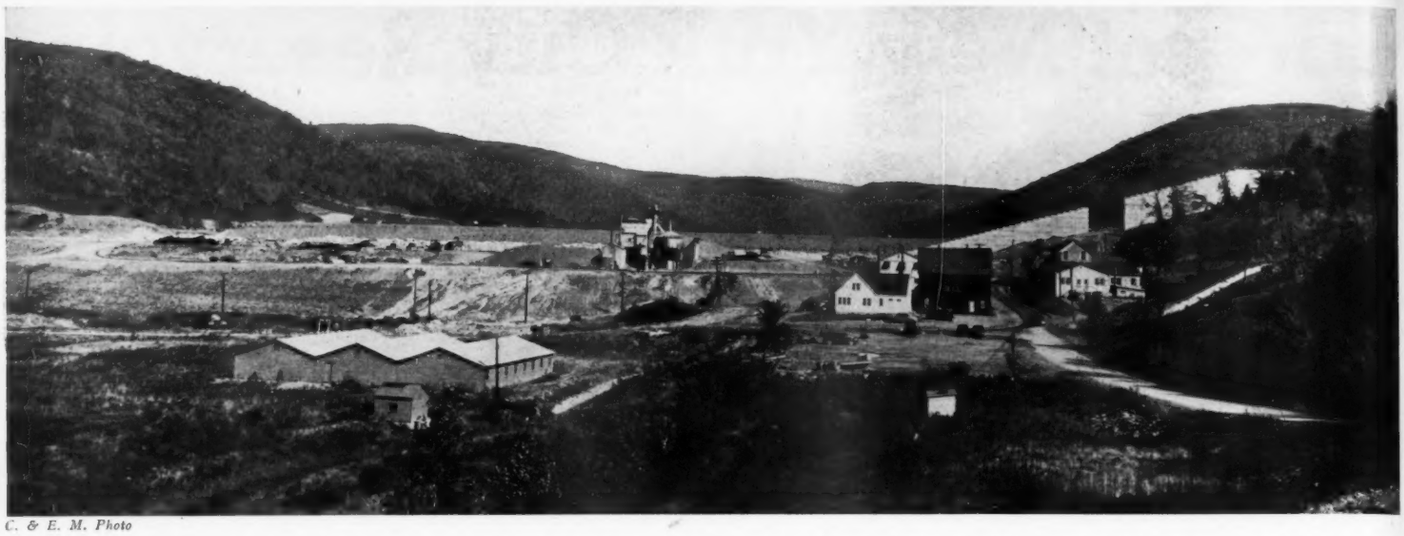

C. & E. M. Photo

You're looking toward the site of Downsville dam. The batch plant shows up in the center, and, to the right, part of the concrete cutoff wall, the core of the dam.

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Downsville Dam Forms Large City Reservoir

(Continued from preceding page)

sion tunnels, with inclined shafts connecting the channels with the tunnels. Later the tunnels are to be plugged with concrete just back of the shafts.

Downsville Contracts

First-stage construction on the Downsville project started late in 1947 after the Board of Water Supply awarded a contract to the joint-venture team of Walsh Construction Co. of New York City and B. Perini & Sons, Inc., of Framingham, Mass. This initial contract included the diversion tunnel, upstream dirt cofferdam, and concrete cutoff wall. The tunnel is a 40-foot-diameter circle 2,155 feet long, cut through solid rock in the north or right-side abutment of the dam. The cofferdam is about 1,800 feet long across the valley, with a maximum height of 75 feet from original ground elevation at 1,100, to the top of cofferdam at 1,175; side slopes are 2 to 1.

The cutoff wall of plain concrete was constructed in a trench that was excavated through 100 feet of overburden down to bedrock. Below elevation 1,030 the wall is 10 feet wide and from elevation 1,030 up to elevation 1,070 it is 8 feet wide; from that level it batters in to a 4-foot width at the central top portion which is at elevation 1,130. At the sides of the valley the cutoff wall climbs up the abutments to a top grade of 1,280. By September, 1949, the river

(Continued on next page)

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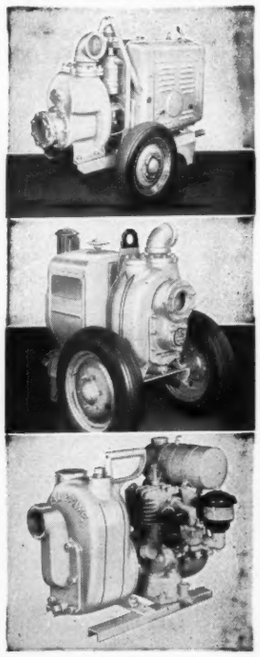

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was diverted through the tunnel, thus permitting the completion of the cutoff wall through the stream bed.

Under the first contract, six large gaps were left in the cutoff wall to facilitate the movements of earth-hauling equipment in the contract to follow. Four of these were in the central part of the wall, and were 45 feet wide x 80 feet high, from elevation 1,050 to the top of the main wall at 1,130 elevation. The other two gaps were left in the sloping side wings of the wall. All gaps were closed with concrete under construction of contract No. 401.

New England Combine

Early in 1950 the Board awarded the second main contract on the Downsville project on the low $17,902,275 bid of a New England combine made up of the four Massachusetts contracting firms of Carlo Bianchi & Co., Inc., of Framingham; Central Construction Co. of Lawrence; Munroe-Langstroth, Inc., of Norwood; and G. L. Rugo & Sons, Inc., of Boston. Carlo Bianchi & Co., Inc. is the operating company in the joint venture. Work on this contract got under way in March, 1950, and is expected to be completed the latter part of 1954, weather permitting.

This contract includes the placing of 6,700,000 cubic yards of rolled-fill earth embankment, and 1,050,000 yards of rock embankment. Dirt material is 100 per cent processed before being placed in the embankment, and for the first time in the Board of Water Supply specifications, the material was required to be put through a grizzly in the processing operation. The big fill quantity is divided into two major items—rolled embankment class A and rolled embankment class B. Class A material totaling 1,950,000 yards is impervious, containing a high percentage of clay, and goes into the core of the dam. When compacted it weighs from 140 to 150 pounds per cubic foot. The more pervious class B material totals 4,750,000 yards of rolled embankment, and is placed on both sides of the impervious core. On the downstream side the class B material is so selectively graded as to be almost free-draining.

The class A material forms the core of the embankment from elevation 1,050 (the bottom of the core-trench excavation) to elevation 1,290. At elevation 1,290 the width of the class A section is 60 feet, from which it widens on slopes of 10 vertical on 3½ horizontal to intersect the slopes of the core trench. The balance of all earth embankment is class B material.

On the downstream side the slopes vary from 3 to 1, to 4 to 1, while on the upstream side the slope range is from 2½ to 1, to 4 to 1. A service road will extend across the top of the dam from the new road on the south side to the control house over the release water tunnel. Through its base the dam has a width of 1,600 feet, plus a 200-foot weighted section on each side that gives it a total width of 2,000 feet from toe to toe of slope.

The crest of the weir in the spillway channel is at elevation 1,280, the flow line of the reservoir, which provides 24 feet of freeboard to the top of the dam at elevation 1,304. This contract also includes the overflow spillway, waste channel, release water tunnel, shaft, and control works, all built into the north side of the dam. The overflow from the reservoir will go over an 800-foot spillway weir into the weir channel and be carried downstream to the inclined tunnel and outlet through the 40-foot-diameter diversion tunnel. An emergency waste channel will be constructed from the inclined tunnel to the outlet channel directly above the diversion tunnel.

With the dams on the Delaware River, New York City is not permitted, by order of the Supreme Court, to take all the water from the watershed. A certain flow must be maintained at Port Jervis, N. Y., farther downstream in the dry months as well as when the reservoir may be overflowing. Hence the need for the 8-foot-diameter release water tunnel with controls on its flow into the diversion outlet.

Processed Material

During the 1950 construction season the contractor worked a borrow pit of class A material located about ½ mile upstream from the dam on the south side.

The impervious material was excavated with power shovels, loading bottom-dump Euclids, and hauled to the grizzly where all stones over 5 inches in diameter were removed. The loaded Euclids were driven over a timber and concrete structure discharging loads into a 150-cubic-yard receiving hopper. Material was carried from this hopper by a heavy-duty 60-inch Oro feeder and discharged onto a bar grizzly to remove stones larger than 13 inches. The balance of the material fell into a chute and was deposited on a 60-inch Hewitt-Robins belt conveyor which carried it 174 feet on a 16-degree slope to a screening plant where all stones over 5 inches were removed. The material leaving the conveyor was divided so as to pass over two 6 x 12-foot Robins heavy-duty scalping screens which were set back to back at right angles to the conveyor.

Under each screen was a 75-yard storage bin into which the processed material dropped. A chute on each side carried off the plus-5-inch material into end-dump Euclids waiting below. These large pieces, together with the stone rejects from the grizzly, were hauled away for use in the rock portions of the embankment. From the storage bins air-controlled gates dumped the processed class A mate-

(Continued on next page)

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Downsville Dam Forms Large City Reservoir

(Continued from preceding page)

rial from the hoppers into bottom-dump Euclids which hauled to the embankment. The plant was designed to produce 1,000 cubic yards an hour of the desired impervious type of fill.

This plant was also used, when class A material could not be placed, to process class B material from another borrow pit on the south side of the river. A temporary scalping screen was also set up on the north side of the river to process additional class B material. As at the other pit and plant, shovels at the pit loaded into Euclids which hauled the material to the plant, while other Euclids hauled the processed dirt to the dam, the hauls averaging ¾ to 1 mile. During the 1950 work season, greater emphasis was put on placing class A material, the core of the dam. This year class B will get more attention when another grizzly is set up, also on the north side of the river, to turn out approximately 2,000 yards of processed material an hour.

Dirt work halts for the winter in this climate as soon as heavy frosts are experienced, but rock excavation was kept going in the spillway and weir channel, and shaft. Suitable rock that is excavated, together with the rock rejects from the processed fill material, will be used to cover the dam slopes with a protective blanket of varying thickness as specified. Over the rock on the downstream slope will go a 24-inch layer of dirt, followed by a 12-inch course of topsoil that will be grassed. Only some of the stripping, of all the material excavated at the dam, will be wasted.

Ground-Water Control

An efficient system of ground-water control was installed along the axis of the dam to unwater the core-trench section while the fill was placed around the cutoff wall. Water was drained into a collector system consisting of 3,000 linear feet of perforated pipe from 6 to 18-inch diameter which was laid at elevation 1,045. The pipe drained into two sumps, one upstream and the other on the downstream side of the cutoff wall. Each sump was 10 feet wide x 30 feet long x 11 feet deep. From the sumps 10-inch pipelines rose vertically 90 feet to the top of the concrete wall. The shafts were enclosed in 42-inch pipe for protection during the placing of the fill next to the wall.

Platforms built atop the wall held four Worthington 10-inch 1,500-gpm pumps that unwatered the sumps through a total head of 110 feet. One electric and one diesel-driven pump was on each side of the wall. The usual procedure was to run the two electric-operated pumps (motor-driven), one to each sump, holding the other two, powered by GM diesels, as standbys. The pumps were automatically controlled, and had an average discharge totaling 3,000 gallons per minute.

From the pumps a 12-inch discharge ran along the top of the wall for a short distance, then cut downstream at right angles across the open core trench to reach original ground surface. The 160-foot span over the trench was supported by a suspended cable line. When ground level was reached, the water passed through a weir box where the flow was measured, and then chlorinated as an extra precaution since the water might be used further downstream. From the chlorinator house the water was carried through an open sluice and a closed pipe to a settling basin for the removal of any turbidity. Then it was discharged through a channel to the river, downstream of the dam site.

Impressive Equipment Array

The contractor combine put an impressive array of equipment on the project, including 9 excavating machines—7 shovels and 2 cranes. Shovels consisted of one Lima 3½-yard, two P&H 3-yard, and four Bucyrus-Erie 2½-yard rigs. Cranes were a Lima 1½-yard crawler unit with booms up to 100 feet long, and a Lorain truck crane. Excavation was hauled in 36 bottom-dump Euclids, holding 15 yards heaped; 17 end-dump Euclids, 9 with 18-yard capacity and 8 holding 10 yards; and 4 Sterling trucks, with Boulder Dam bodies carrying 13 yards.

Crawler tractors totaled 23—two Allis-Chalmers HD-19's, and the rest Caterpillar D8's. They were used with dozer blades for leveling off the fills; equipped with rake blades to scarify the surface of a lift so as to get a good bond with the next lift; and for pulling sheepsfoot rollers. Class A, the impervious material for the core, was spread in 7-inch layers and compacted to 97 per cent Proctor density with 14 passes of a single sheepsfoot roller or 7 passes of rollers in tandem. Southwest sheepsfoot models were used exclusively in this part of the work.

Class B, the more pervious material outside the core area, was spread in 8-inch layers, and compacted with 8 passes of a sheepsfoot roller or 4 passes of a tandem sheepsfoot roller. A Southwest 3-drum flat roller was used in sealing off a layer of fill. Water to provide the optimum moisture content was supplied by four Sterling tank trucks holding 4,000 gallons each. From a drought-stricken region in 1949, the dam site was anything but dry during

(Continued on next page)

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the 1950 construction season. Constant rains eliminated all but the occasional use of tank trucks, and obviously retarded the fill work.

This early fill operation deep in the core trench was, of necessity, carried on at a slow pace in the limited confines on each side of the wall. At the start only 16 feet of working width was available on the downstream and 26 feet on the upstream side. Machines came down into the hole on ramps, and made their turns in the gaps left in the cutoff wall. This year the rate of dirt-moving will increase considerably after the core trench is completely backfilled, thus giving the hauling equipment greater room in which to operate.

In backfilling close to the wall, up the steep abutments, and in such close quarters as around the pipe encasing the shafts from the sumps, the material was compacted with Barco Pegson Rammers and Master Backfill Tampers.

Closing the Wall Gaps

As the fill in the trench was brought up, the gaps left in the cutoff wall were closed by filling them up with concrete placed in 4-foot lifts. Steel forms were used in the original wall construction, but wooden forms were set up for the closure sections. Concrete was supplied by Kenneth E. Curran, Inc., of Littleton, N. H., which took over the facilities that were left at the site from the first contract. These consisted of a Butler batch plant located just downstream of the dam containing a 100-yard 3-compartment aggregate bin and a 1,020-barrel cement bin and silo.

Sand and gravel for the aggregate was processed nearby, with the cement supplied by Lehigh, Alpha, and North American plants. It was delivered in bulk cars to a siding of the New York, Ontario & Western Railroad at either East Branch or Arkville, N. Y., and hauled from there to the plant in trucks. Water for the mix was pumped from a deep well into a storage reservoir. Concrete was delivered to the forms in a pair of Ransome 3-yard transit mixers mounted on Ford trucks, after they had picked up the materials at the batch plant.

On the lower portions of the wall gaps, the mixers chuted the concrete directly into the forms. For the higher pours the concrete was discharged into 1-yard buckets which were handled by the Lorain truck crane.

Rock Work

Drilling and blasting of the rock was sublet to the Rock Construction Co. of Kingston, N. Y. As the bulk of the rock excavation was on the north side of the river, a battery of four Joy 630-cfm compressors was set up by the side of relocated State Highway 30 to supply air for the drilling. From the compressors a 6-inch steel pipe, serving as a receiver, ran down the hill of the right abutment 300 feet to where the waste channel and spillway cut were located. Most of the drilling was done with wagon drills—8 Worthington and one Joy—using 1¼-inch drill steel in 8 and 16-foot lengths.

Timken bits, 2½-inch down, were employed with the drill steel, the blast holes being spotted on from 5 to 6-foot centers both ways. A pair of Markley dust collectors drew off the stone dust created by the drills. The rock was taken off in 16-foot lifts, the holes being charged with from 16 to 18 half-pound sticks of Hercules No. 2 dynamite. The average shot consumed about 1,600 pounds of powder. In the blue standstone and red or gray shale, from ½ to ¾ pound of dynamite was required to yield a yard of rock. Walter Dunham supervised the drilling and blasting work of his company. Excavation of the rock was handled by the general contractor.

Maintenance and Personnel

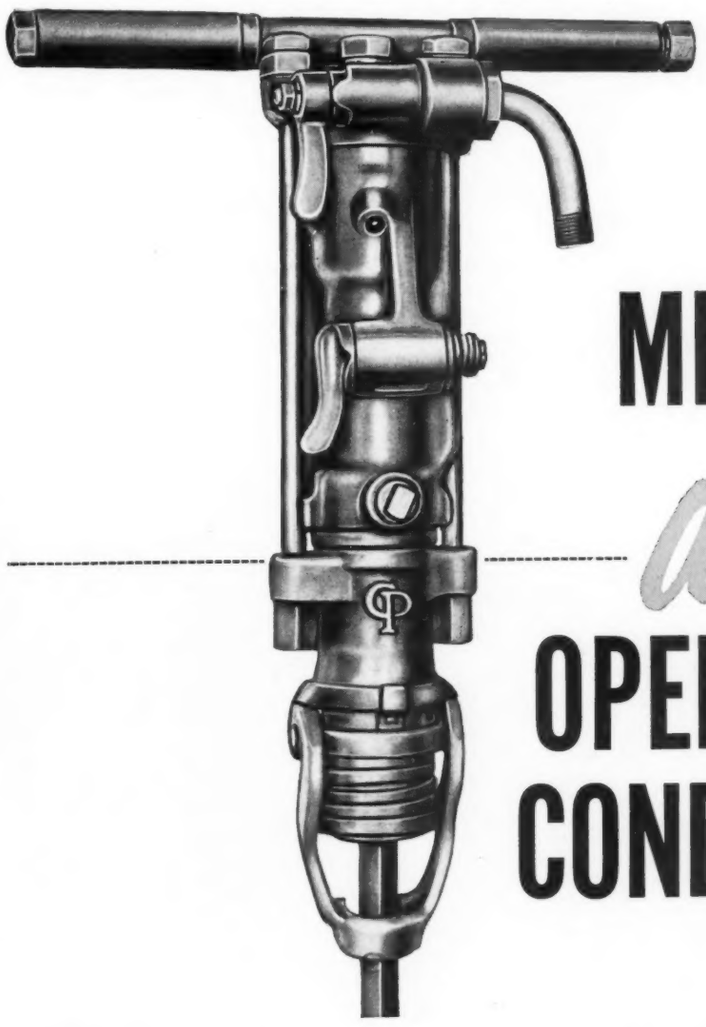
Dirt-moving is carried on in two 10-hour shifts during the construction season, from 7 a. m. to 5:30 p. m., and from 7 p. m. to 5:30 a. m., with ½ hour for lunch in each shift. The 1½-hour period between shifts is given over to the maintenance and servicing of equipment. Two grease trucks lubricate the various units while in the field. Floodlights for night operation on the fill are strung along the top of the cutoff wall, with power furnished by the New York State Gas & Electric Co.; a project substation has been set up on the site.

On the height or north bank is a blacksmith shop and general repair shop housed in two 50 x 120-foot Quonset huts. On the south or left bank is a 2-story field office for the contractor, and a single-story building for the engineers. On the lower floor of the contractor's building is a locker room with shower facilities for the work crew which numbers around 300. A first-aid dispensary and a nurse are available 24 hours a day.

(Concluded on next page)

Also 4-hp and 7-hp Chain Saws in sizes from 19" to 72".

LOMBARD GOVERNOR CORP., Ashland, Mass. Dealer Opportunity.



MEETS *all* OPERATING CONDITIONS

Not only does the CP-59 Sinker outperform any other drill in the 55-pound class, but it can be used for (1) plain dry, (2) blower dry, (3) plain wet, or (4) air-water operation.

This is made possible by its 4-in-1 backhead, which permits quick, inexpensive change-overs from one type of operation to another.

Its remarkably high drilling speed, exceptionally strong rotation, unsurpassed hole cleaning, excellent riding qualities—all make for fast, efficient, economical performance.

Maintenance is low because of such features as a replaceable bronze chuck rotation nut to protect piston splines from scoring, and a replaceable bronze bushing liner to make it easy to maintain piston alignment and full cushioning.

Get in touch with your nearest CP office for a demonstration of the CP-59, or write for a copy of SP-3009.

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PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Downsville Dam Forms Large City Reservoir

(Continued from preceding page)

The major items on this Downsville Dam earthwork contract include the following:

Earth excavation	175,000 cu. yds.
Rock excavation, open cut	560,000 cu. yds.
Rolled embankment, class A	1,950,000 cu. yds.
Rolled embankment, class B	4,750,000 cu. yds.
Refill and embankment	550,000 cu. yds.
Rock embankment	1,050,000 cu. yds.
Concrete mass in open cut	80,000 cu. yds.
Concrete mass, shaft and tunnel	20,350 cu. yds.
Pumping	100,000 mill. gals.
Portland cement	210,000 bbls.

Key personnel for the Bianchi, Central, Munroe-Langstroth, Rugo joint venture consist of Peter M. Bianchi, Project Manager; Thomas A. Coyne, General Superintendent; James E. Munroe, Superintendent on structures; T. R. Sullivan, Treasurer; Elford H. Richardson, Chief Engineer; John R. Kohnke, Field Engineer; and R. H. Willmott, Office Manager.

For the Board of Water Supply, Barney J. Sullivan is Division Engineer with headquarters at Downsville, assisted by I. W. Guttridge, Senior Section Engineer. John M. Fitzgerald is Chief Engineer of the Board, with Victor C. Brownson, Chief Engineer, and N. LeRoy Hammond, Department Engineer, Western Department.

Apprentice Training, A Continuing Study

The advantage of employing full-time directors of area-wide apprentice programs in the construction industry, to work with local joint employer-labor committees, is explained in a 26-page bulletin issued by the Bureau of Apprenticeship, U. S. Department of Labor, Washington 25, D. C. This is another of the bulletins prepared by the Department under its continuing study of apprenticeship problems.

The bulletin, No. T-125, explains the functions of the directors, how their services are financed, the programs they direct, and the kinds of programs in which they are most needed. The study, which was made at the request of the General Committee on Apprenticeship for the Construction Industry, also estimates the number of programs which should be benefited by the employment of full-time directors.

Another publication of the Department, of interest to construction men, is the 18-page booklet on joint apprenticeship committees, entitled "JAC—Key to Successful Apprenticeship in the Construction Industry". Among the topics discussed are the selection of apprentices, training on the job, classroom instruction and attendance, tests to determine progress of apprentices, bringing about an understanding of the program by participating groups, and public-relations activities.

Both booklets may be obtained without charge from the Bureau of Apprenticeship.

Data on Drainage Pipe

Where your drainage problem is limited headroom or fast runoff, the new bulletin published by Armco Drainage & Metal Products, Inc., Middletown, Ohio, suggests the use of Armco Pipe-Arch or Multi-Plate Pipe-Arch. This new broadside, entitled "An Economical Answer to Limited Headroom—Fast Runoff", explains that these products carry more water than round pipe; it cites test data and case histories to show that these products have more than sufficient strength to withstand both live and dead loads encountered in normal service.

Sizes and recommended gages are given for various standard highway load requirements. Illustrations of the various applications and methods of installation are also included. The folder discusses erosion and corrosion problems and describes how Paved-Invert and Asbestos Bonded Pipe-Arch can be used to solve them.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 992.

Surveying Instruments

A 1951 catalog of surveying instruments designed for contractor and engineering service is now available from David White Co., 315 W. Court St., Milwaukee 12, Wis. It presents a complete line of transits, levels, alidades, tapes, and surveying aids. It describes the precision construction of the principal instruments in detail and illustrates them with cross-section drawings and cutaway photographs. Other products include hand levels, tripods, leveling rods, plumb bobs, bush knives, marking pins, tape-grip and tension handles, and compasses.

This literature may be obtained by requesting Bulletin No. 1051 from the company, or by using the Request Card at page 16. Circle No. 885.

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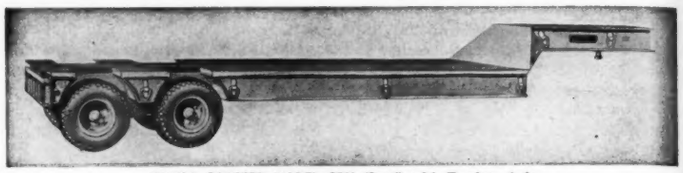
Capacities through 75 Ton—Semi and Full Trailers



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PATENTED TANDEM AXLE ASSEMBLY—Featuring unusual lengthwise and sidewise wheel accommodation to irregularities in the road. Use of full width tubular forged, heat treated axles with CAMBER.

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- TwinDual Roll Crusher
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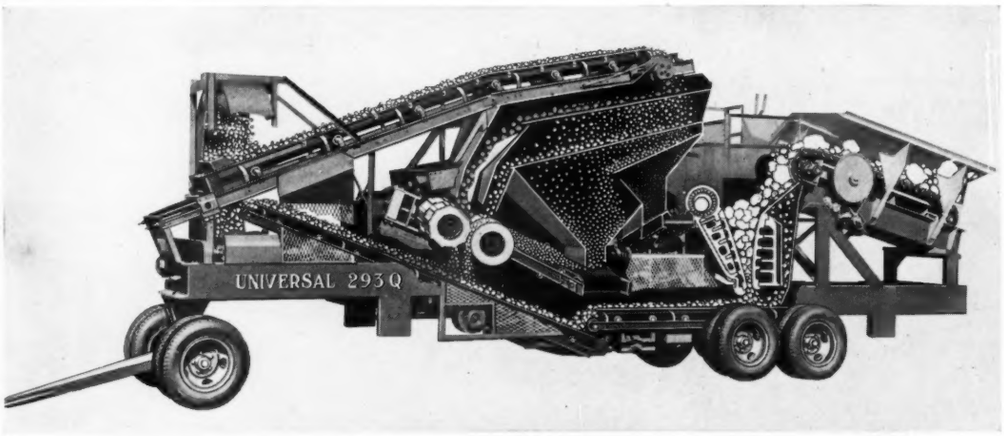
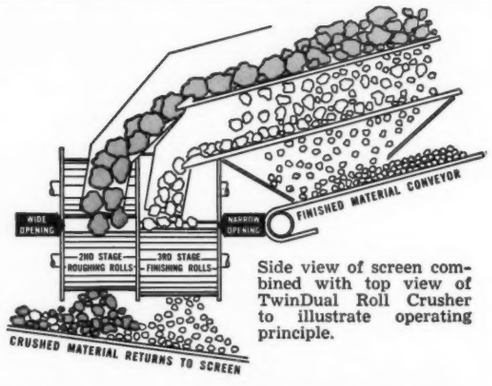


PIT OR QUARRY — rock or gravel. Name your operation. The TwinDual Pacemaker sets new standards for profitable hour after hour tonnage at low cost per ton. Three crushing operations with Universal's exclusive TwinDual Method provide top capacity, divide the load between three crushing stages. Permit a more favorable ratio of reduction resulting in longer crusher life, less maintenance and better quality finished product.

There is much more to the profitable TwinDual Story. Facts are yours for the asking. Bulletins U520 and U501 will give you detailed information.



Side view of screen combined with top view of TwinDual Roll Crusher to illustrate operating principle.

UNIVERSAL ENGINEERING CORPORATION division of PETTIBONE MULLIKEN CORP.

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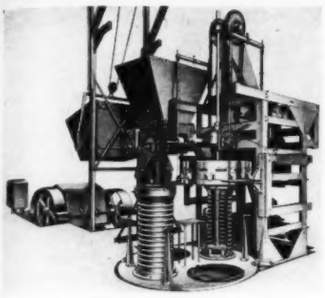

The improved Model T McCracken machine makes 4 to 36-inch-diameter concrete pipe and strips it bell-end up.

Improved Machinery Makes Concrete Pipe

Three or four new features have been announced for the McCracken Model T concrete-pipe machine. Made by Concrete Pipe Machinery Co., 1st and George Sts., Sioux City, Iowa, the Model T will turn out 4 to 36-inch-diameter pipe, and strip it bell-end up. This feature eliminates tipping over the pipes in the carts before they are stripped in the curing room.

The Model T uses the Packer-Head on sizes 10 inches and smaller and the new Packer-Roller-Head on sizes 12 inches and up. This Roller-Head permits the use of more coarse aggregate for sizes 12 inches and larger, the company says. To permit packing the bells for bell-and-spigot pipe and the grooves for tongue-and-groove pipe, the revolving bell-packing element has its driving mechanism in the hopper. It is now driven from above instead of below, which permits substituting for a long single chain a short, double, roller-chain drive between the close centers. The company also reports that the improved Model T permits closer control on the speed of the bell packer to provide better corners in the socket end of all pipe.

Sturdier hopper guides are another improvement. The belt conveyor on the new unit has an independent drive consisting of a motor with a speed reducer to provide 6 different speeds. It has an automatic stop-and-go switch to deliver the mix at the time and in quantities needed for the size being made. The variation in speed and the adjustable front gate to the storage boot result in close control of the mix delivered to each pipe.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 993.

Aluminum Bridge Railings

A new 50-page manual on aluminum bridge railing, a relatively new field for aluminum and one on which little technical information is available, has been prepared by Reynolds Metals Co., 2500 S. Third St., Louisville, Ky. It analyzes the features of aluminum for this service and presents typical designs to show the possibilities in the field. The manual is a result of Reynolds' engineering work with customers who have built aluminum bridge railings.

To make the handbook most useful, complete stress-analysis data are included, as well as the relative cost structure. Comparative data for aluminum versus steel, with information on how to design aluminum shapes having the same impact strength as steel, are also included. The booklet covers design detail, methods of assembly, and surface treatments. It consists of several sections in a hard-cover folder so that additional data and information may be added as necessary.

This literature may be obtained by addressing the Reynolds Metals Co. on your company or organization letterhead.

B-L-H Buys Austin-Western

The assets and business of Austin-Western Co., Aurora, Ill., have been purchased by Baldwin-Lima-Hamilton Corp. There will be no change in Austin-Western management or personnel. Certain products will be sent to other Baldwin-Lima-Hamilton plants for manufacturing, and the Aurora plant will concentrate on producing road graders, in greatly increased quantities, and a new hydraulic crane.

Bituminous Distributor

A 4-page folder describing the Bituminizer distributor and the Spraymatic bar is available from William Bros Boiler & Mfg. Co., Minneapolis 14, Minn. Features of the Bros Bituminizer, as outlined in the literature, include a V-bottom rectangular tank, diamond-shaped flue, side-mounted power unit, gear-type pump, multi-use material-handling system, and one-man cab control. Each feature is illustrated and fully described. Cross-section drawings of the Spraymatic bar illustrate its end-to-end circulation. Complete specifications are included on the distributor, which is available in capacities of 1,000 and 1,250 gallons.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 994.

SAVE 1/3 ON PORTABLE ELECTRIC PLANTS

New Winpower Portable Plants, powered with heavy-duty Wisconsin engines save you approximately 1/3 on purchase price. Especially designed for contractor use, with full range of sizes, 300 to 10,000 watts. Quality built for 25 years — famous for long, dependable service. Write today for free literature and prices.

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Here's your answer to the job of ordering replacement clutch plates, facings and brake linings. These catalogs give you, in handy ready-reference form, all the information you need to quickly select and specify the Velvetouch parts you want.

They're individualized catalogs . . . one for Caterpillar equipment, one for LeTourneau, one for Allis-Chalmers, and one for International . . . so that you don't have to plow through dozens of unrelated listings to find the items you require.

Just fill-in and mail the coupon, and we'll send your copies at once . . . together with a brief, interesting story explaining why Velvetouch all-metal clutch plates, facings and brake linings are "standard equipment with the leaders!"

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The Ryan sod cutter can cut up to 5,000 square yards of sod a day, in thicknesses from ½ inch to 2½ inches.

Powered Sod-Cutter

One man can cut up to 5,000 square yards of sod per day with the Ryan power sod-cutter, according to a recent announcement of K & N Machine Works, Inc., 871 Edgerton St., St. Paul 1, Minn. The sod will be uniform in thickness, the company reports, because the blade makes the cut directly under the power wheel. This blade is made of tempered spring steel and works with a shuttle action in cutting through the roots. A shock release is provided so that the blade "gives" when it meets a stone or other hard object.

The cutting blade is 12 inches wide and the thickness of cut is adjustable from ½ to 2½ inches. An 18-inch and special cutting widths are also available. Powered by a 4-hp Wisconsin engine, this unit makes sod-cutting as easy as mowing a lawn, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 995.

RCA Expands Sales Force

The RCA Victor Division of Radio Corp. of America, Camden, N. J., has added 12 men to its Communications and Microwave Sales Group and made Dana Pratt, former Sales Manager for RCA broadcast transmitter equipment, its Manager. George W. Pettengill, communications sales engineer, will assist Mr. Pratt.

The new field sales representatives and their regional headquarters are: Wayne L. Babcock and Douglas J. Upton, Hollywood, Calif.; A. Fischer and Donald O. Reinert, Camden, N. J.; George A. Griffith and Dixie B. McKey, Dallas, Texas; Adron M. Miller and T. W. Kennedy, Chicago, Ill.; G. E. Rand and J. M. Walters, Atlanta, Ga.; C. Kenneth Sulger, Cleveland, Ohio; and Arthur E. Konick, N. Y. C.

New DC Arc Welder

A new selenium rectifier-type dc arc welder is made in two models—40 to 250 and 60 to 375 amperes—by Miller Electric Mfg. Co., Appleton, Wis. Features claimed are arc start surge; exclusive electric-current control which makes remote-control operation possible; no moving parts; no replacement stock such as brushes, bearings, etc.; instantaneous voltage recovery; low starting current; and low arc blow.

Lifting hooks on the side of the welder make it easy to handle with an overhead hoist. The amperage indicator is on the front of the welder where the operator can see it from a distance. The standard input power requirement is 220/440-volt three-phase 60-cycle ac current. The knob-type current control and "off and on" switch are on the front panel. Remote current control can be installed. Units can be paralleled for high-current application.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 996.

Roadside-Protection Bulletin

The Highway Research Board's Committee on Land Acquisition and Control of Highway Access and Adjacent Areas has released a bulletin reporting its activities during 1949 and the progress which it is making in various fields.

The Bulletin includes four papers given at the 29th Annual Meeting of the HRB. Two of these papers report progress on roadside surveys made in Michigan and Minnesota. J. Carl McMonagle indicates in his report "Accident Analysis—Telegraph Road 1947-1948", that there may be a closer correlation between highway accidents and the condition of the roadsides than between highway accidents and elements of the highway, on the road sections studied. K. B. Rykken's report, "Minnesota Roadside Survey, Progress Report on Accident, Access Point, and Advertising Sign Study in Minnesota", says that a relationship between access points and accidents is becoming apparent.

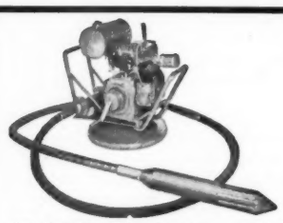
The other papers cover a roadside survey made in Iowa. In "Highway Accidents in Relation to Roadside Business and Advertising", Professor P. H. Elwood gives a general picture of the roadside problem and specifically the Iowa problems which were responsible for the study. W. A. Rusch, who made the Iowa study, reports on the methods used and conclusions reached in his paper "Highway Accident Rates as Related to Roadside Business and Advertising".

Copies of this bulletin, No. 30, may be obtained from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. The price is 75 cents.

Exhaust-Pipe Shields

Literature about the Sol Hot exhaust shield is available from H. M. Sheer Co., 419 Payson, Quincy, Ill. This unit is adjustable for all types of equipment with exhaust pipes up to 3⅛ inches in diameter. The circular illustrates its use and some of its important features. It also describes an adaptor ring for pipes up to 4¼-inch outside diameter.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 926.



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which have made them successful all over the world.

All Flexible Drive Sections are Interchangeable.
No special sections, or expensive extra couplings needed. Each casing has ball bearing connector.

No Limit to Length of Flexible Drive.
Each driving core has slip joint which does not separate in service. Prevents stretching.

All Vibrator Heads are Interchangeable.
Can be put directly on any drive section. Can be opened for repairs. Double row ball bearings.

Grinding Spindles can be attached to any section.
No special drive needed. For wet and dry grinding.

Standard Power Units.
Gasoline engines or electric motors which can be serviced almost anywhere. Swivel base. Barrows.

Minimum of Repair Parts Needed.
One spare driving core is ample. Either 7' or 12'.

Write for circular and name of nearest dealer.

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50% more yardage with LODOVER

LODOVER crowds into and loads material — Backs straight out — bucket moves overhead at controlled speed — Stays level — in back position bucket turns over completely as operator dumps load — Bucket returns to digging position as LODOVER moves forward . . . Complete overhead cycle takes only 20 seconds.

1 yard Combination Overhead and Front End Shovel for INTERNATIONAL TRACTORS

Write for booklet— "HOW TO Increase Tractor-Shovel Production — Decrease Tractor-Shovel Maintenance"

. . . LODOVER overhead loading eliminates 2 full turns—saves 15 seconds in every cycle! Seconds saved add up to extra yardage—60% if distance from cut to truck is 30 ft.—43% if distance is 40 ft. . . . Add big extra yardage to reduced tractor maintenance costs—both due to "no-turn" overhead operation — and you have the reason why LODOVER makes extra money for you on any job!

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● Those big stones won't slip from the Wellman Stone Grab. Four-part closing cable reeving develops tremendous closing force on stones. Model shown has 5-ton capacity, 4½ foot jaw spread. Other capacities available.

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Asphalt Treatment Reclaims Road Base

Stabilization With MC-2 Is Done by Contact as State Tries Something Different in Base Construction

C. & E. M. Photo

A Wood PT-600 Preparizer puts MC-2 Positive asphalt in the soil on Inland's contract in Kansas. The transport truck holds 2,800 gallons.

• FROM Atwood, Kans., for a distance of 8.087 miles to the east, U. S. 36 crosses terrain so rough that the road is a succession of 4 and 5 per cent slopes, with straight alignment. Built back in 1935, the bituminous surface had been patched until maintenance had long since reached a point of diminishing return.

The Kansas State Highway Commission decided, at that point, to try something different that would reclaim the section at moderate cost. Tests showed that 6 inches of solid-asphalt stabilization would carry the traffic in much better shape. On August 8, 1950, Inland Construction Co. of Omaha and Wichita began work on an $85,135 contract, which included ditch cleanout, 6 inches of soil-asphalt, a seal coat, and about 2 miles of guardrail removal and replacement.

It has been, from start to finish, an unusual job. Nothing went exactly according to plan. When the contract was let, C. L. Meredith of the Highway Department rushed to Atwood and worked for six days with a survey party staking the work. Then operations began on the other end. The same thing happened with the soil-asphalt. Methods which had been planned were discarded in favor of better ones, with the final result that pavement demolition, soil mixing, soil-asphalt mixing, and almost everything else was done by a Wood PT-600 Preparizer. But we are getting ahead of the story . . .

Road Follows Old Route

There was no new grading or relocation work, since the old roadbed was used throughout. The old wearing surface was 24 feet wide; so is the new one. Traffic was detoured around a country road, but even so, very little room was left for construction equipment to turn around. The route is a succession of deep cuts and high fills, with no shoulder room.

For this reason, the length of sections under construction at one time varied from ½ to 1 mile, depending strictly on turn-around facilities.

Old Mat Ripped Up

The old bituminous mat, when it was first laid, consisted of an asphalt surface treatment laid directly on the yellow clay loam, with a little sand, which is common to this region. Over the years this thin mat had been patched and half-soled by maintenance men until it had an average thickness of 1½ inches. In many spots, however, holes had been filled with bituminous material and the mat was as deep as 18 inches.

Inland selected a Model PT-600 Wood Preparizer to pulverize this old cake. The PT-600 is driven by the towing tractor through a long driveshaft, somewhat similar to the old-model Wood Roadmixer. A D8 Caterpillar tractor was the towing unit.

The machine, 6 feet wide, made a starting pass along one edge, returned along the opposite edge, and closed to the center in 5 passes. Five passes, rather than 4, gave enough overlap to do a better job. In ordinary thicknesses,

(Continued on next page)

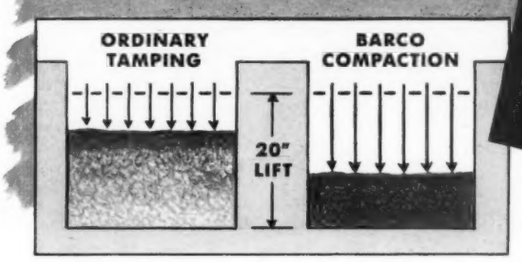
Lick THOSE MAN POWER SHORTAGES!

. . . and drill holes in concrete faster and easier. TERMITES are the answer. They step-up manpower efficiency on all concrete drilling jobs. Enables you to drill more holes with fewer drills. Diameters up to 5". Fits standard electric drills. Get details today.

TERMITE ROTARY MASONRY DRILLS

TERMITE DRILLS, Inc.
2082 Foothill Blvd., Pasadena 8, Calif.

FASTER! BETTER!
SOIL COMPACTION



Here's Why

ONLY the BARCO RAMMER can produce specified compaction on lifts up to 20 inches*. This is due to the "one-two punch" of the Rammer. The Rammer jumps about 14 inches in normal operation. It drops with the weight of about 200 lbs. Immediately after the impact, the operator trips the handle causing the Rammer to jump into the air again. This gives a follow-through, or thrusting effect, to the original impact. This double impact differs from the "quick pat" of other tamping devices which tend to produce compaction only on the surface of the fill.

The Barco Rammer is a completely self-contained unit; no auxiliary or extra equipment is required. With a Barco Rammer one man can do the work of five! Ask for the nearest Barco Distributor to give you a demonstration. *Catalog and information on request.* BARCO MANUFACTURING COMPANY, 1818-F Winnemac Ave., Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal.

*With lifts from 12" to 20" and averaging two passes, up to 24 cubic yards can be compacted per hour.

for soil compaction close to walls, culverts, and abutments —in trenches, ditches

BARCO
"Pegson" Gasoline
RAMMER

Distributors Located in All Principal Cities

FREE ENTERPRISE . . . THE CORNERSTONE OF AMERICAN PROSPERITY

C. & E. M. Photo

Inland's Bros Wobble Wheel roller drawn by an International I-9 tractor compacts the finished soil mix.

Asphalt Treatment Reclaims Road Base

(Continued from preceding page)

the machine moved along well, but where the old mat was thick, the tractor lugged down and needed help. In some of the thick spots several passes had to be made, and as many as three tractors were used to pull the Preparizer.

Specifications called for the pulverized material to be broken down so 100 per cent of the particles would pass a 2-inch mesh. The old oil cake was stubborn enough so that several sheepsfoot-roller passes and a heavy disk had to be used before the material was satisfactory. When it was pulverized sufficiently, one or two of the four Caterpillar No. 12 motor graders assigned to the project moved in and windrowed the pulverized bituminous material along one edge of the roadway.

In general, this part of the operation went along fairly well as planned, with the exception that the old bituminous mat was considerably tougher than had been anticipated.

Soil Blending

The next step in the stabilization process was the preparation of soil underneath the mat. Traffic, over the years, had compacted the soil to some extent, so that it had to be dug out and pulverized. Specifications permitted Inland to clean some ditches nearby and place up to 3 inches of material on the roadbed from this excavation, and that was done in the designated sections.

It was planned at first to break up and pulverize the roadbed soil with the Preparizer, and then come along later and add the necessary moisture. Triaxial tests had indicated that an average moisture content of from 12 to 13 per cent would give the best degree of compaction.

But the Preparizer did such a good job, moving along at 135 feet per minute, that somebody hit on the idea of putting the moisture in while the machine worked. A 3-inch water pump, driven by a Ford V-8 engine, was mounted on the Preparizer frame, and water trucks were hooked on. As the Preparizer pulverized the soil, the water squirted in and was mixed. The material took huge amounts of water, and shed it rapidly. For example, they hauled 32,000 gallons of water into one section one day to raise the content above 9.3 per cent, and the water loss was so severe that they barely held their own!

The water came from a large artificial lake near the north edge of Atwood, involving a 6 to 7-mile haul.

The ditching work which was done as a part of this operation consisted mainly of casting dirt with a Caterpillar elevating grader. The material was dumped direct to the highway, spread ahead of the Preparizer, and the ditches were also later shaped to final section by motor graders.

Specifications for soil pulverization called for 100 per cent of the material to pass a ¾-inch mesh.

After the soil was all pulverized and blended with its water content, motor graders quickly bladed the pulverized oil-mat particles over the roadway so the surface would be flat.

Mixing

Mixing, too, was one of those things which grew, through trial and error, into a satisfactory procedure. At first, the company planned to shoot the MC-2 Positive cutback asphalt on the road with distributors. This would not work for the simple reason that the hot asphalt wanted to run all over the steep grades.

"Why not use the Preparizer with the asphalt?" somebody asked, and again the men began to improvise.

A 3-inch asphalt pump was put on the machine, replacing the water pump. They took a by-pass valve, a pressure

(Concluded on next page)

Do your sealcoating and ice control jobs the fast easy Swenson way. Spreads any width or amount desired.

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Lindenwood, Illinois

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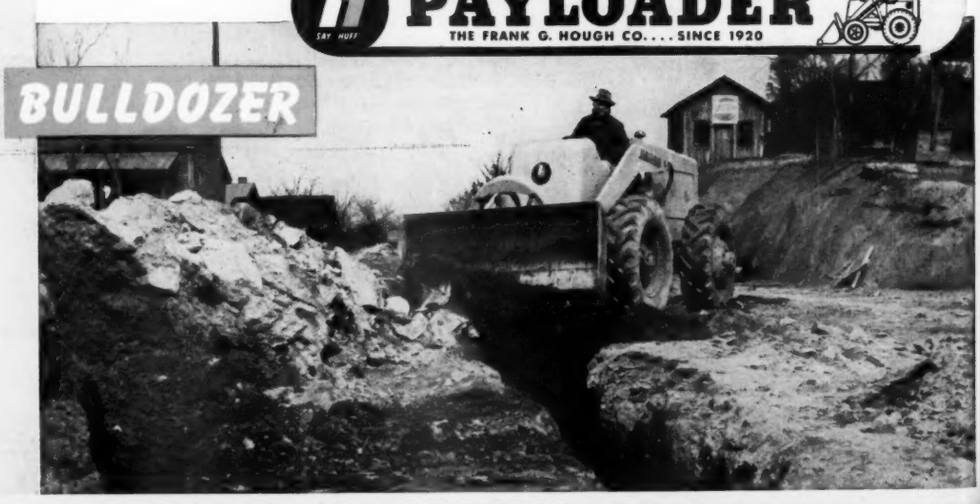

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gage, and a meter from a Wood Roadmixer, and installed it on the Preparizer. Then, when they put the asphalt in while the Preparizer tines were mixing the soil at high speed, the asphalt stayed where it was put.

About 6 per cent of MC-2 Positive was put in the lift, approximately one-ninth of the total material being applied at one time. The asphalt was trucked 280 miles from the Frontier Refining Co. in Cheyenne, Wyo. Melton Transport Co. hauled the material in large tank trailers, some of which would carry over 4,500 gallons.

Bad weather complicated the mixing process enormously. Since there were no transfer facilities, the big transport trucks hooked on direct to the Preparizer, and that usually meant a spare Caterpillar tractor to help them turn around and get up the hills. Rain often dampened the soil to such an extent that the D8 tractor ahead of the Preparizer had a hard time to keep the machine deep enough, and moving along at a constant rate of speed. Naturally a steady rate of speed is important when asphalt is applied.

The asphalt went in at temperatures of from 145 to 170, after having been loaded out at the refinery at about 225 degrees average. Only one load of material had to be reheated, and that was because a truck broke down with its load for 3 days. A small Cleaver-Brooks retort was always handy, however, in case it was needed.

A total of approximately 10 passes by the Preparizer was necessary to inject the total volume of asphalt over the entire roadway.

When the oil had all been applied, motor graders moved in and windrowed the entire surface, mix and all, into a stack with an end area of 16 square feet. The windrow was placed as close to the edge as possible. For about 20 hours afterward, two motor graders, a Seaman Pulvi-Mixer, and a disk worked together to complete the mixing and aerate the material. It was then ready to lay.

So badly did the soil lose moisture that often, during the laydown, water had to be added by sprinkler truck. As the motor graders laid the mix down, two sheepsfoot rollers behind an International TD-18 compacted it. The top was finished out by an I-9 International with a Bros Wobble Wheel roller.

The top was crowned to standard Kansas specifications, which call for a parabolic 2-inch crown in 8 feet from the center line, with a straight slope of ½ inch per foot thereafter.

The seal coat consisted of 0.25 gallon of MC-2 per square yard, covered with CM-1 cover chips.

Starting at the east end, section after section was finished in spite of unseasonably damp, cold weather. Many days the asphalt was applied during and immediately after rains. The grainy, friable soil shed water like a duck's back, however, and the asphalt trucks were unloaded when they came in.

The finished project is expected to reclaim this troublesome section for several years in the future, and is expected to furnish valuable data of an experimental nature for further construction of this type, especially on high-type secondary routes.

C. & E. M. Photo

Left to right, Ray Purvis and C. L. Meredith of the Kansas inspection force discuss the mix with Superintendent R. H. McElroy.

Personnel

The work under Inland's contract was supervised in the field by R. H. McElroy, General Superintendent. D. F. McClelland was Resident Engineer, working under the general supervision of H. O. Reed, Engineer of Construction; R. C. Keeling, State Highway Engineer; and C. E. Priest, Division Engineer.

PM Buys Rome Grader

Pettibone Mulliken Corp., Chicago, has purchased the Rome Grader Division of Union Fork & Hoe Co., Rome, N. Y. The Chicago plant of Pettibone Mulliken has begun to manufacture, distribute, and service all sizes of Rome graders, but for the time being, the Rome plant will also continue to make them. No large-scale change in personnel is contemplated.

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Consider these Features:
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Model C
The versatile Model "C" with exclusive planetary drive for dependable power has 6 "quick change" attachments. Saves bringing in "extra" equipment. Three-quarter cu. yd. scoop is standard equipment.
• Transports, elevates and pours concrete.
• Shovels, loads, transports dirt or bulk materials.
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ATTACHMENTS INCLUDE: Swivel-type concrete hopper. Scoops in 5 sizes. Lift forks. Special fertilizer or hay fork. Crane boom. Track extensions up to 26 feet.
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Model M-7
This complete mobile concrete mixing and elevating plant eliminates costs of hauling and erecting expensive equipment. One man handles the entire operation—quickly "sets-up" ready for pouring... then controls every operation from dump truck to deck.
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• Sturdy planetary drive hoist clutches.
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Power-packed dozer at one end... scoop at the other. The Duo-Way is designed for top performance. Unit with 84-inch dozer blade, optional, at one end, and 1-cu. yd. scoop at the other end performs four operations—loader, dozer, truck and tractor.
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Full Line of Equipment Featured in New Catalog

A new 40-page booklet describing the full line of construction equipment manufactured by Caterpillar Tractor Co., Peoria 8, Ill., is now available. It contains a complete list, with pictures and brief specifications, of 81 Caterpillar products. Nine of the eleven new models announced during the past year are included.

Products described are tractors, cable bulldozers, straight-blade and angling-blade hydraulic bulldozers, motor graders, scrapers, tool-bar arrangements, cable controls, hydraulic controls, rippers, wagons, diesel engines, marine engines, and diesel-electric sets.

This literature may be obtained from the company by requesting Form 30081, or by using the Request Card at page 16. Circle No. 904.

Nordberg Sales Engineer

Robert P. McBride, who came to Nordberg Mfg. Co., Milwaukee, Wis., in 1950, is now Sales Engineer in the company's Heavy Machinery Division. He was previously assigned to field installation service.

The new Concut Model 51 saw for cutting concrete and asphalt.

Mobile Saw Slices Concrete and Asphalt

A new self-propelled saw for cutting concrete and asphalt has been announced by Concrete Sawing Equipment, Inc., 15 N. Oakland St., Pasadena 1, Calif. Known as the Model 51 self-propelled Concut, this new machine is used for sawing concrete and asphalt streets, concrete floors, airport runways, etc., prior to the breaking and removal of the material, thereby providing a smooth, straight edge for patching. Other uses include sawing contraction joints, sawing for the installation of expansion joints, grooving for crack control, and grooving ramps and steps for safety.

The self-propelled feature, it is claimed, increases the life of the cutting blade and speeds the sawing operation. Other features include a dash panel showing water-pressure gage, spindle-speed tachometer, motor throttle, cutoff switch, and transmission control lever. The new lever-lock control feature, the company says, enables the operator to remove the blade from the cut, then lower it to the same depth without changing the adjusting screw. The self-propelled Concut is powered by a 13.3-hp gasoline engine to provide sufficient power for tough sawing and uphill operation. Cutting depth is determined by the size of the blade being used.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 862.

A Jack for Every Use

A new 16-page bulletin cataloging a complete line of ratchet, screw, and hydraulic jacks—in capacities from 3 to 75 tons—has been prepared by The Buda Co., Harvey, Ill. It features a table of contents by jack models and by industries, a table to help select the correct jack, application photos, recommended uses for jacks, special features of jacks, and detailed specifications.

The selection table covers 16 types of jacks with a wide range in capacity, and enables a choice to be made according to the load to be lifted, amount and speed of rise, space of operation, control of lowering, ease of operation, and initial cost. Also presented are trench braces, push-pull and shoring jacks, and a diesel nozzle tester.

This literature may be obtained from the company by requesting Catalog No. 1515, or by using the Request Card at page 16. Circle No. 997.

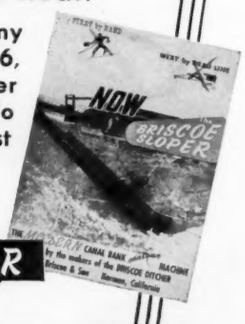
Richkraft Appoints Arents

The Richkraft Co., Chicago, Ill., manufacturer of reinforced waterproof papers, has appointed Chester A. Arents, Coordinator of Research at the Illinois Institute of Technology, as its technical consultant.

THE MODERN CANAL BANK contour MACHINE

Slope your canal banks to any degree wanted – cut back the berm–spread the spoil away from the bank–up to 3 miles per hour.

Quickly attached to any crawler-type tractor of D6, D7 or D8 power. Sloper blade and spoil wing do entire job in a single, fast operation.



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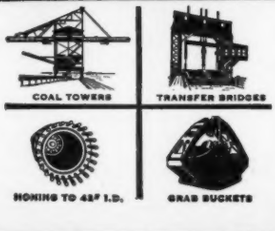
DRIVING STEEL PILING more than 100 feet below water

A deep pile foundation was needed for the Pettys Bayou bridge, designed to be supported by two cellular-type abutments and eight caisson-type piers. More than 8,000 linear feet of tapered steel shell piles up to 120 feet in length were driven below the water by a McKiernan - Terry Double - Acting 10-B-3 Pile Hammer. Piles were driven in pairs opposite each other, to equalize pile friction and possible tendency of caissons to shift. Powerful, fast-driving McKiernan-Terry equipment is available for every driving job. The complete line includes 17 sizes of hammers and extractors. Write for bulletin.

The photograph shows piles being driven by a McKiernan-Terry Pile Hammer for a bridge across Pettys Bayou in Ottawa County, Michigan. Luedtke Engineering Company and W. Lamb were joint contractors.



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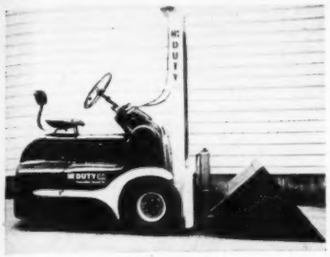


Transitier has developed a new 9-cubic-foot hydraulically controlled bucket for its bulk-material truck.

Mobile Power Unit For Bulk Materials

A new power bucket with a 9-cubic-foot or ⅓-cubic-yard capacity has been developed by Transitier Truck Co., 2477 N. W. 23rd Ave., Portland, Oreg., for its bulk-material-handling truck. The hydraulically actuated bucket provides controlled dumping and may be opened, closed, or stopped in any position. It will dump at a height up to 7 feet 10 inches on a 9-foot mast. The company reports that the bucket closing action makes it easy to get a full load. The Transitier is also convertible to all lift-truck operations.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 998.

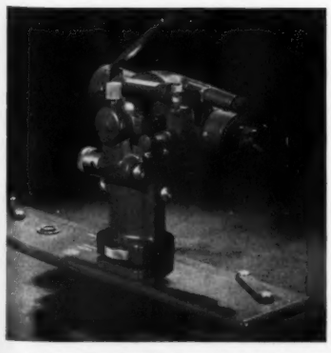
A Compact Alidade For "Topo" Surveys

A telescopic alidade of entirely new design, based on the principle for the optical-scale theodolite, has been announced by Jarrell-Ash Co., 165 Newbury St., Boston 16, Mass., national distributor for Hilger & Watts Ltd. of London. Its most important feature is the optical-scale reading of the vertical arc from an eyepiece alongside the telescope. In addition, the instrument is streamlined, compact, lightweight, and is therefore easy to handle and to carry.

Tangent screws and spring boxes are built right into the pillar to give a good hand grip for carrying the instrument. The pillar is pivoted at the base, and by adjusting the semiprojecting milled head, it can be leveled within 2 minutes by the cross bubble, the company says. An adjustable mirror for reading the spirit level allows a complete observation to be made without the observer changing position.

The Microptic alidade is constructed of light alloy and is protected by enamel. All controls are chromium-plated. The telescope has an aperture of 31 mm and a magnification of 15 power. The 15-inch blade is fitted with a circular bubble and parallel rule. The alidade has an overall height of 8½ inches and a net weight of 4½ pounds. All accessory equipment required for plane table work may also be obtained from the company.

Further information may be secured from the company. Or use the Request Card at Page 16. Circle No. 952.



The design of the Microptic alidade is based on the principle for the optical-scale reading of the vertical arc from an eyepiece alongside the telescope.

Portable-Conveyor Bulletin

Four portable conveyors designed for speed and ease in operation are fully described and illustrated in the new Bulletin 450 offered by The Fairfield Engineering Co., 348 Chicago Ave., Marion, Ohio.

First of these is the all-aluminum utility conveyor, a one-man unit weighing 100 pounds — for handling sand, gravel, cinders, lime, etc. The lightweight and the heavy-duty troughed-belt conveyors, Models 666 and 608 respectively, are designed for a higher capacity and heavier work. The power belt car unloader, Model 134-B, is designed specifically for unloading material from railroad cars to conveyors and trucks. This unit has a capacity of 60 to 80 yards per hour, the literature says. Illustrations, dimensions, and a brief description are given of each model.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 937.

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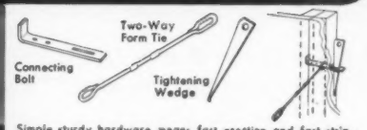

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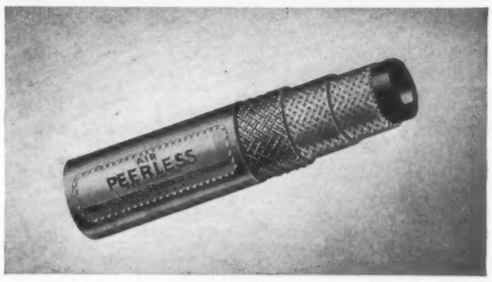

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Modified Road Plan For the Emergency

North Atlantic States Officials Score Wartime Neglect and Offer Modified Highway Program for the Emergency

• A TERSE warning that highways are not expendable was given at the 27th Annual Convention of the Association of Highway Officials of the North Atlantic States, held at the Traymore Hotel, Atlantic City, March 7-9. A grim reminder of what happened to the nation's road system during the last war was voiced by the Association's President, Ray F. Smock.

In his address at the opening session, Mr. Smock, Secretary of Highways of Pennsylvania, emphasized that highway neglect is against the best interests of the nation, and that road improvements must be continued during the present emergency period. More explicitly, he pointed to the continued necessity of diverting time, money, and effort to rehabilitating the roadways which were neglected, instead of meeting today's and tomorrow's demands for new construction. "The insufferably stupid policy of highway expendability" must be replaced by an intelligently planned program that will contribute to our civilian economy and military effort.

The Modified Program

Lead-off speaker for an important panel discussion on "What Policies and Techniques Are Necessary to Modernize and Extend the Life of Our Existing Pavements?" was C. H. Buckius, Assistant Chief Engineer, Pennsylvania Department of Highways. "To establish successful policies," said Mr. Buckius, "we must alter some basic thinking on our highway needs and methods of financing our construction programs." Public apathy to previous recommendations by state highway departments, he suggested, has been a result of the unrealistic sums of money alleged to be necessary to correct highway and street deficiencies. Pointing out the obvious, Mr. Buckius said, "it is impossible to construct all of our roads and streets to the highest engineering standards in the immediate or distant future with the sums which will be available." Therefore, *"idealistic designs must yield to tolerable standards* which will permit our highways to do the job ahead." He reported that the modified doctrine applied to Pennsylvania's 41,000-mile state highway system has met with results that are endorsed by highway users.

According to this doctrine, the highest engineering standards would be followed on new construction and reconstruction in Pennsylvania, but on limited reconstruction and additional-lane construction, improvements would be to tolerable standards which are considered satisfactory for the period involved. Mr. Buckius stated that it would cost almost as much to improve 1,206 miles to idealistic standards as it would to improve 4,719 miles on the state trunk-line system to tolerable standards. The 4,719 total includes 1,539 miles of new construction and reconstruction. When state highway administrators and engineers direct their thinking toward similar practical solutions of their problems, motorists and taxpayers will have more confidence in their reports and recommendations, he said.

Another significant suggestion offered by the Pennsylvania representative was that each level of government recognize its own responsibilities to finance necessary highway and street improvements. "This", he said, "applies especially to the state level which we, at this convention, represent." He pointed to the number of crises that since 1933 have led toward a centralized bureaucratic control—"necessary in time of war but deadly to initiative and responsibility in the years of peace." Mr. Buckius said, "If we are honest in our analysis and conclusions we will find centralized control has not been due primarily to usurpation of power by the high level of government, but to a willing abdication from lower levels in permitting the higher level to assume our responsibilities, on the fantastic and fallacious theory that it can furnish the necessary finances and know-how at a cheaper and less painful cost to the beneficiaries of the alleged gratuities."

He asked the members of this meeting to become the prime leaders in re-establishing state responsibility and in calling a halt to the ruinous advocacy of increased Federal subsidies. He cited his state's position. "Pennsylvania was alone in opposing increased Federal Aid to the state in the 1950 Federal legislation", he said, and "was opposed to increasing the percentage of Federal Aid on the interestate system."

The Waters Plan

Charles R. Waters, District Engineer of the New York State Department of Public Works, outlined the basic policy proposed by New York for continuing highway improvements during the emergency. This resurfacing and rehabilitating program, now known as the

(Continued on next page)

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They are the answer to your demands for tractors that will give you outstanding performance on a variety of applications—whatever those jobs may be.

Behind the design are your own ideas . . . and those of your operators and mechanics...combined with the vast experience of Allis-Chalmers.

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POWER TO SPARE—A large untapped reserve (up to 1/3 of peak available hp.) assures easier going on toughest work—longer engine life, less servicing. Morever, it has been proved that General Motors 2-Cycle Diesels are unmatched in lugging ability; they build up torque faster and higher . . . hold it longer.

MATCHED POWER TRAIN ASSEMBLIES—Each and every part of the power train—from master clutch to final drive—has more than enough capacity and strength to handle any load it was ever meant to carry. Bigger clutches, booster steering, double-reduction final drives, all add life—get more work done.

REVOLUTIONARY SHIFT PATTERN—A quick, one-lever shift from any forward speed to any reverse position saves shifting motion and time—smoother and easier, too.

POSITIVE BALANCE—Tractors work equally well with any equipment—drawn or mounted. There's *greater stability* and *traction* with more track on the ground and lower structural weight. Main and truck frames are heavier, truck frames longer . . . idlers are bigger, and both idlers and sprockets lowered . . . all steel construction throughout. Up to 50 percent more ground clearance!

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Waters Plan, is intended to extend to 30 or 40 years the life of a pavement that normally might be rebuilt at the end of 20 years. Mr. Waters said, "The way to keep a road system in shape is to save what you have wherever you can, resurface it, make such improvements as you have money for, and then jump to high standards on those roads that have gone completely to pot or where the alignment and grade are abominable." Though an advocate of high standards in the design of new roads and of throughways and expressways, he pointed out that 40 per cent of the roads in a state system cannot be rebuilt at one time, and that steps must therefore be taken to lengthen the useful life of deficient highways. Mr. Waters cited a number of examples where this plan was put into effect in New York, and the results achieved.

E. W. Kilpatrick, State Highway Engineer of the New Jersey State Highway Department, suggested in the panel discussion that all states get together and agree on a standard axle load so that new roads can be built intelligently in the future. Supporting the proposals of Messrs. Buckius and Waters, he explained that such modified programs were most important to New Jersey whose 2,000 miles of state system are a corridor between New York and Pennsylvania.

Mr. Kilpatrick also discussed at some length mud-pumping procedures to renovate old roads. By using the best available material for mud pumping, New Jersey has been able to obtain strengths up to 800 psi in 14 days, he said. Slabs have been raised as much as 14 inches on a road that will carry 50,000 to 60,000 vehicles per day. For severely deteriorated roads, Mr. Kilpatrick recommended breaking up the entire slab and using the old road as a subbase for a new slab. He also reiterated the importance of drainage on all classes of roads.

Maryland Road Test

Fred Burggraf, Associate Director, Highway Research Board, delivered a paper outlining the preliminary results of the cooperative truck-traffic test in Maryland. Principal object of Road Test One-MD was to determine the relative effect on a particular concrete pavement of four different axle loadings on two vehicle types. In addition to preliminary results of the test, the paper included details on financing, description of the road schedule of traffic operations, and test procedures.

The results showed that the 44,800-pound tandem-axle load caused approximately 11 times as much cracking per linear foot as the 32,000-pound tandem-axle load; and that the 22,400-

(Concluded on next page)

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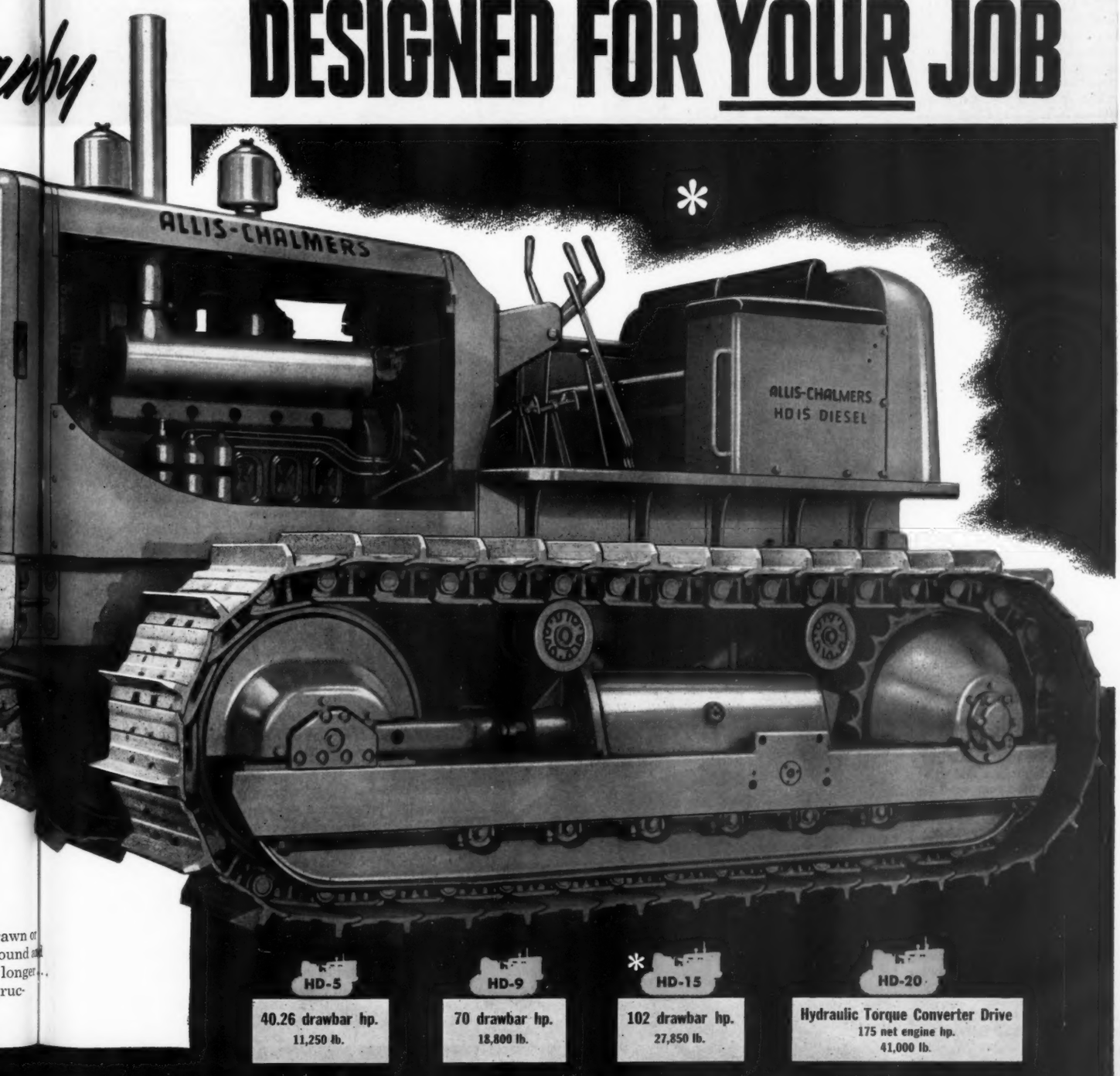

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HD-20 — Hydraulic Torque Converter Drive — 175 net engine hp. — 41,000 lb.

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Modified Road Plan For the Emergency

(Continued from preceding page)

pound single-axle load caused approximately 6 times as much cracking as the 8,000-pound single-axle load. (A more detailed report on the results appears in the March, 1951, issue of CONTRACTORS AND ENGINEERS MONTHLY, page 39.) Summarizing, Mr. Burggraf pointed out that this investigation has furnished highway administrators and engineers with qualitative facts regarding the effects of axle loads of different intensity on a concrete road; has increased and to a certain extent verified our knowledge of the interrelationship between loads, pavements, and subgrades; and has acted as a stimulus for further research.

Maintenance Studies in Conn.

A preliminary 10-week report of maintenance research conducted in Connecticut was made by A. L. Donnelly, Engineer of Roadway Maintenance, Connecticut State Highway Department. The entire study, expected to be completed in August of this year, will involve a thorough field survey of each section of highway. The overall study will record pavement conditions: porosity or slickness of surface, stability, cross section, superelevation of curves, subsurface drainage, shoulders, culvert adequacy, and slopes. From this the State will decide on the type of treatment applicable to each section.

Mr. Donnelly discussed methods of developing basic data about the use of labor and equipment. The 10-week report he said, tabulates work accomplished on various maintenance operations—surfacing, roadside development, drainage, guardrail, and snow and ice control. It is expected that the 12-month tabulation of units of accomplishment with a fixed typical setup of men and equipment will furnish very valuable data for planning in advance the time required for each maintenance operation during the year. The data are also expected to provide a basis for budget estimates.

Fill Stabilization

Two other papers of interest were those on fill stabilization delivered by John O. Morton, Deputy Commissioner and Chief Engineer, Department of Public Works and Highways, New Hampshire, and R. S. Bodwell, of Porter-Urquhart Associated, Consulting Engineers. Mr. Morton cited conditions under which stabilization could be accomplished by surcharging. He described briefly the overall problem of fill settlement and its relationship to highway construction. He recorded actual accomplishments of surcharging, and evaluated the advantages and disadvantages of this method compared to others. Mr. Bodwell gave examples of the use of sand drains for similar purposes.

Other Papers

Other papers delivered at the meeting included an address by Burton W. Marsh, Director, Traffic Engineering and Safety Department, American Automobile Association, on "What Will the Average Motorist Expect in Highway Construction?"; a paper titled "Where Do We Go From Here?" by Hal H. Hale, Executive Secretary of the AASHO; a discussion of "War and the Interstate Highways" by B. D. Tallamy, Superintendent of Public Works, New York; and a report on "Prestressing Concrete and Structural Steel for Highway Pavements and Bridges" by L. Coff, Consulting Engineer.

Resolutions

Resolutions passed unamimously at the meeting directed state and Federal attention to the urgent necessity for continuing an accelerated program of highway construction and maintenance. The Association also recommended that further taxation on motor fuels be reserved to the states. It reinforced its intent to keep Federal hands out of state pockets, by petitioning Congress to reject once and for all the proposal to tax the income from state and municipal bonds. It also urged that the original single-purpose bomb-shelter program be modified and revised so as to include practical objectives such as the elimination of traffic congestion and related problems.

Election of Officers

The following men were re-elected to offices of the Association: Ray F. Smock, President; A. Lee Grover, Secretary and Treasurer; and Kenneth D. Rice, Assistant Secretary and Treasurer. R. J. Abbott, Highway Commissioner of the State of New Jersey, was elected Vice President. Russell H. McCain, Chairman of the Maryland State Roads Commission, was elected to the Board of Directors.

Concrete-Vibrator Catalog

Literature describing both gasoline and electric-driven concrete vibrators is available from Dart Mfg. & Sales Co., Denver 4, Colo. Three gasoline and three electric models are illustrated and described. The 3 and 5-hp gasoline models are available with pedestal or wheelbarrow mountings. The 1.8-hp Dyna-Mite vibrator is designed specifically for use on small jobs. Detailed data on the Dart vibrator head and cable and operating core are also given.

Other products treated include a grinder attachment for the vibrator, sump pumps, flexible shafts, and concrete saws. Specifications and prices are given for each.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 922.

Surfa-slick Patent Applied For

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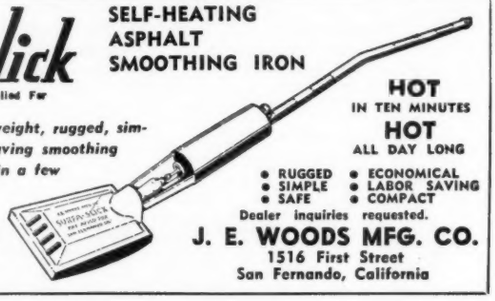

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"It's thumbs down on overuse of belt dressings which causes lumpy accumulations that result in loss of power and serious belt damage. Republic Transmission Belts have positive gripping surfaces that keep slippage at a minimum."
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YOUNGSTOWN, OHIO

New Repair Shops Built in Wyoming

Maintenance Facilities Are Boosted as New Buildings Go in Strategic Locations Over the State

• THE summer of 1950 will long be remembered by the maintenance men of the Wyoming Highway Department, because it was then that the obsolete tin sheds many of them used began to be replaced by modern buildings. Scattered over the state at strategic locations, the new structures are warm, roomy, and comfortable.

The 4 new buildings under way are all being built by contract. Typical of the big program are two of the units, one at Torrington and the other at Newcastle, which were built by Contractor Max Luton of Gillette, Wyo.

The Newcastle building cost about $80,000. It is a brick structure, built around a very heavy structural-steel framework. The building is 80 x 140, with a 60 x 140 main repair shop for the care of maintenance equipment.

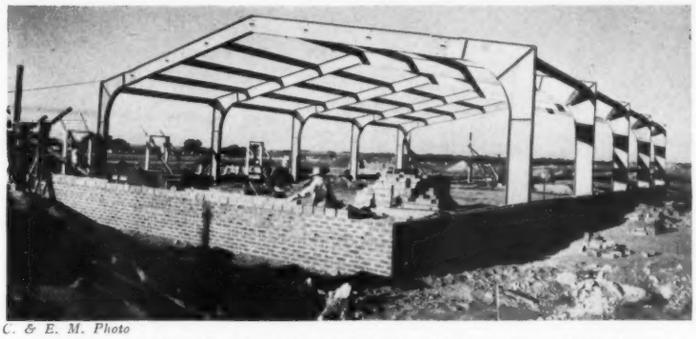
The part of this building not occupied by the main shop consists of a boiler room, a large office and drafting room, and shower facilities. It will have an overhead crane suspended from the Burkhardt Steel Co. structural beams. The large windows are mounted in Ceco steel frames.

Construction was primarily a painstaking, slow process. Truck-mixed concrete was used for all the slabs, footings, and stub walls. Bricklaying was the biggest job, and was done by four men skilled at the trade. The roof is a composition asbestos and asphalt affair.

The shop at Torrington is very similar in design, because it, too, is a brick building built around structural steel. It is 80 x 100, with a 60 x 100 repair shop, and offices similar to those in the Newcastle building. Instead of an overhead crane, the Torrington shop has floor pits. Both buildings are so designed that they can be enlarged some time in the future if it is required.

In the erection of the steel, there was some difficulty getting riveters, so Dardalet bolts were used on both buildings.

The work was done under the general supervision of J. R. Bromley, Superintendent, and W. E. Sutton, Maintenance and Equipment Engineer of the Wyoming State Highway Department.



C. & E. M. Photo

One of the new shops being built for Wyoming maintenance men—at Torrington. Bricklayers are at work. The contractor is Max Luton of Gillette, Wyo.

Cummins Imports Steel

Late last year, realizing that U. S. steel mills could not continue to supply its total requirements for certain types of high-quality steel, Cummins Engine Co., Inc., Columbus, Ind., sent its supervisor of purchasing, K. S. Shaw, and its chief metallurgist, H. H. Lurie, on a European steel-buying trip. Shaw and Lurie visited mills in France, Belgium, Norway, and Germany.

Orders were given and the first shipment, 136,000 pounds of low-alloy and carbon steel, from Belgian mills left Antwerp for New York on February 9. This steel was reshipped to forging plants in Lansing, Mich., and Indianapolis, Ind., where rough forgings were made. The forgings are finish-machined at the Cummins factory.

Shaw and Lurie were able to place orders for approximately 85 per cent of the total steel originally sought from European sources. Future orders, Cummins says, will depend on the company's ability to obtain complete steel requirements in the U. S., and on the quality and delivery schedules of European steel.

Circular on Auger Bits

A new circular describing Midway auger bits for hand braces and electric drills has been issued by The Midway Tool Co., Inc., Melvin, Ohio. It describes bit features including hammer-forged special chrome-alloy steel stock, a clear open throat for faster chip clearance, and the new Mirbrite (mirror-bright) finish made rust-resistant by a special protective coating. It lists 17 individual sizes of bits for hand braces and 9 bits for electric drills. The circular also includes specifications and weights.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 876.

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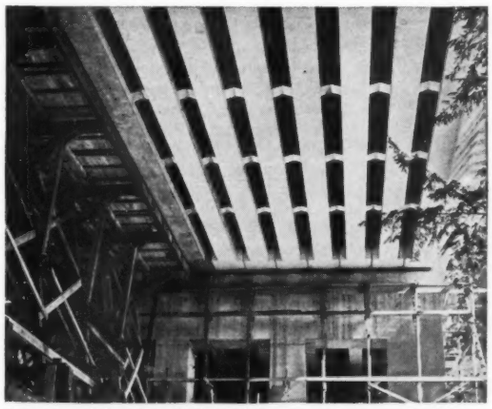
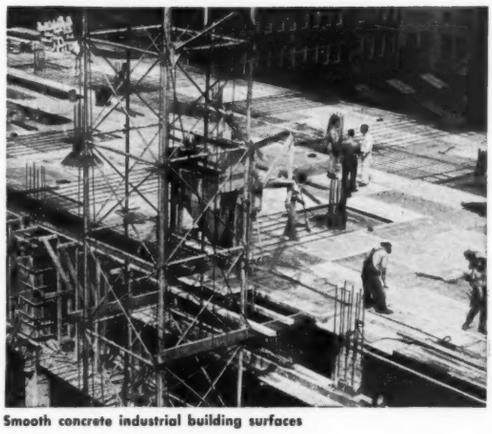


Clean, smooth beams and bridge piers



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Increases use of forms without recoating
Increases life of forms—no grain raising
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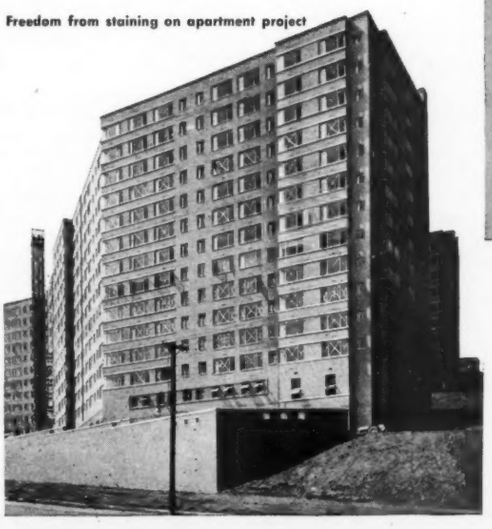
Cleaner, smoother surfaces at lower cost

Freedom from staining on apartment project



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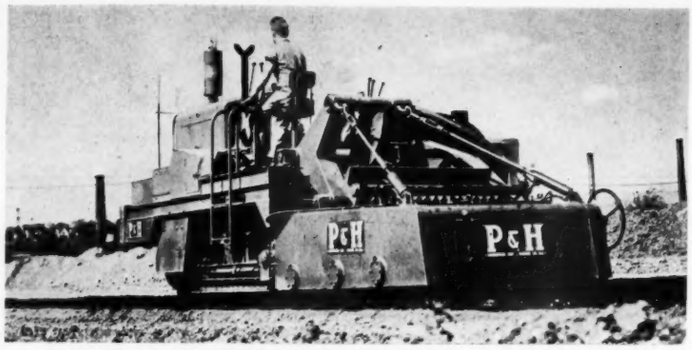
One-Pass Stabilizer For the Smaller Job

A small Single-Pass Soil Stabilizer, designed to make the P&H method of processing stabilized base available for all projects, regardless of size, has been developed by Harnischfeger Corp., 4400 W. National Ave., Milwaukee 14, Wis.

A smaller version of the P&H 8 and 10-foot stabilizers, this new Model EA-56 processes a 5-foot width. It can be used for all types of stabilized-base construction, including soil-cement; cement-treated base; various combinations of cutback asphalt, asphalt emulsions, or tar with soil, sand, or aggregates; and mechanical and chemical stabilization. The 5-foot processing width offers advantages on smaller roadway, street, alley, parking-strip, and other jobs. On larger projects, two or more stabilizers may be used.

The P&H Single-Pass Stabilizer is self-propelled and performs all necessary operations for complete processing of in-place soils with any type of admixture, leaving the materials ready for compaction. It processes in a single pass and requires one operator.

Further information may be secured from the company by requesting Bulletin S-9. Or use the Request Card at page 16. Circle No. 999.



A smaller version of the P&H 8 and 10-foot stabilizers, the new Model EA-56 Single-Pass Soil Stabilizer processes a 5-foot width.

Behavior of Metals

"The Behavior of Engineering Metals", a book authored by H. W. Gillett, formerly Director and Chief Technical Adviser of the Battelle Memorial Institute, New York, N.Y., presents the viewpoint of the metallurgist for those who have not specialized in this field. Since it is intended to help in choosing suitable engineering metals, it discusses the behavior of the metals rather than abstruse theories that seek to explain the behavior. Technical terms are used as little as possible, and references are selected for easy reading as well as for technical content.

The first six chapters of the book introduce the basic concepts of metallurgy. The terms are introduced in natural sequence, and examples show how they are used. The next nine chapters deal with the behavior of each of the principal commercial metals and alloys, and the remainder of the book is devoted to special considerations that may influence the selection of metals and alloys. These include such topics as machinability; special fabricating techniques; means of using or selecting metals so as to combat the effects of corrosion, wear, and high temperature; and some "tricks of the trade". The vital factors of cost and availability are the subject of the closing chapter.

The new text is published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Its price is $6.50.

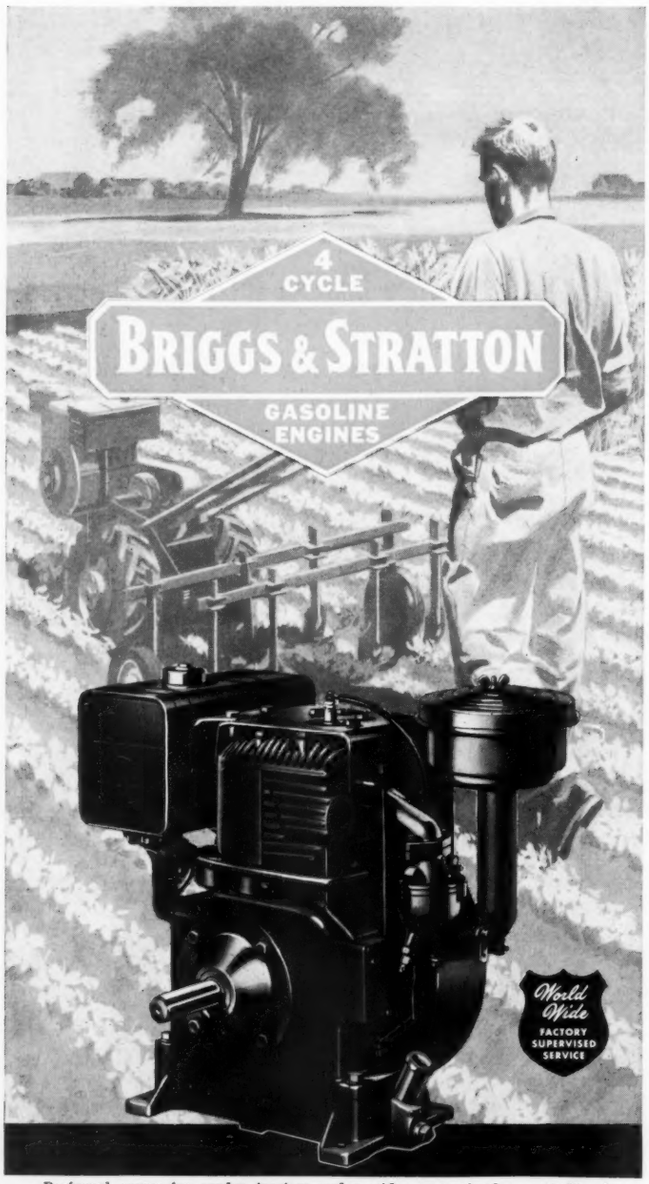
New Blacktop Sealer

A new seal-coating compound designed to protect blacktop pavements against the harmful action of the elements, moisture, petroleum, solvents, salts, etc., has been announced by Troyer Driveway Service, 2157 S. Park Ave., Buffalo 20, N. Y. The company recommends that its product be used on areas not carrying constant traffic, such as driveways, parking areas, tennis courts, private roads and drives, airport taxiways, and the like. Super Seal is also said to improve surface appearance.

Further information may be obtained from the company, or use the Request Card at page 16. Circle No. 960.

Airco Man Heads NPA Section

Dale D. Spoor, Manager of the Equipment Sales Department of Air Reduction Sales Co., a division of Air Reduction Co., Inc., New York City, has been granted a leave of absence to serve with the National Production Authority in Washington, D. C. As Chief of the Welding Section of the Machinery Division of the NPA, Mr. Spoor will have charge of the allocation of critical materials to the welding industry.



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The same sectional assemblies and job fittedness is available in portable and permanent Baughman Conveyors. Speedy quotation, prompt delivery and shipment in most cases from stock, allow Baughman to offer immediate action to your inquiry.

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122 ARCH STREET JERSEYVILLE, ILL.

Cast integrally with a single link of chain, the Uni-Cast elevator bucket cannot loosen and fall off.

New Elevator Bucket Integral With Chain

A new elevator bucket, cast integrally with a link of chain, has been developed by Beaumont Birch Co., 1505 Race St., Philadelphia 2, Pa. Uni-Cast buckets cannot loosen and fall off, are easy to replace, and cost no more than a bucket with a single link of chain, the manufacturer states.

The buckets are made of Beaucalloy, a heat-treated alloy steel. The front edge and corners are reinforced to withstand abrasive action while loading. The bottom is flat to prevent arching. The company points out that the absence of raised surfaces or projecting bolt heads on the inside of the bucket speeds the discharge of material. The buckets are made in five sizes, 8 x 5, 10 x 6, 12 x 7, 14 x 7, and 16 x 8 inches. Other sizes can be made to order.

The company has also developed a new type of drive wheel for bucket elevators. Trac-pull wheels are designed with corrugations on the rim, rather than with teeth as used on sprocket wheels or with smooth rims as used on conventional traction wheels. They are cast of Beaucalloy and can be built to provide any desired amount of traction. They will not jam and break the chain, the company says, and will not slip provided load conditions do not exceed the maximum specified by the manufacturer. The company points out that with the new wheel system it is not necessary to replace the wheel when replacing the chain; moreover, the wheel is not affected by elongation and variation of pitch in standard chains.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 900.

New Shovel-Loader Works Under Ground

A new 1¼-cubic-yard combination overhead and front-end shovel for underground operation has been developed by Service Supply Corp., 20th and Erie Ave., Philadelphia 32, Pa. The underground Lodover is designed for mounting on International T-9 and TD-9 tractors. It will load overhead in a 14-foot shaft, the company reports.

The no-turn feature of the Lodover is said to double track life and to increase production as much as 50 per cent. The loader may be used to dig its own sloping ramps in and out of a tunnel or shaft. All its controls are hydraulic.

The new underground Lodover loads overhead in a 14-foot shaft. It mounts on International T-9 and TD-9 tractors.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 867.

Home Away From Home For Construction Men

A catalog of home-type trailers, designed for the construction man who has trouble finding living quarters for himself or his family near his job, has been prepared by Indian Trailer Corp., 122 E. 63rd St., Chicago 37, Ill. These completely furnished units are designed for living comfort and are balanced for highway travel. Floor plans and interior photographs show the room layout and furnishings. A complete list of specifications is included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 887.

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Maginniss HI-LECTRIC CONCRETE VIBRATOR
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HAS
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Yes, any cut—ON ANY MATERIAL—made in seconds and at amazing low cost. No material is lost from chipping or fractures. Imagine!—One operator and one saw will do the work of 15—or even 25 men equipped with hammers and chisels. And..

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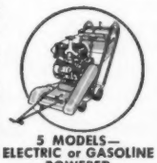
PATENTED CLIPPER FEATURES

1. Makes your blades last longer... Because Equalizer Spring automatically cushions blade pressure whether cutting HARD or SOFT materials. Outstanding for blade economy.
2. One man easily adjusts Cutting Head to desired height... Whether cutting 12" or 1" material. Operator's hands merely guide. Weight supported by rear Bar.
3. Just turn the Save-A-Blade Dial to the material hardness and the pressure Equalizer Spring automatically sets the tension—guarantees faster cutting and longer blade life.
4. Pull the knob—and the Cutting Head is free for finger-tip setting at any desired angle. Release the Knob—and Head is locked in the desired position.

Even on the smallest masonry jobs a Clipper will pay for itself! Brick, Concrete Block, Glazed Tile, Natural Stone—regardless of hardness—they're cut with smooth simplicity. And with the MODEL HD you can choose your cutting method—cut Wet (DUSTLESS) in confined areas or switch to Dry for outside operations. Remember too, there are Nine Clipper Models designed for your job and cost problem.



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Bituminous Concrete Paves Dual Highway

Cross-State Massachusetts Road Has 4-Inch Macadam Base On a 12-Inch Gravel Foundation Course

C. & E. M. Photo

An Apsco spreader lays macadam-base stone on the Massachusetts State Route 2 location. A Ford truck dumps into the hopper.

• MASSACHUSETTS State Route 2 runs from Boston by the sea across the upper part of the state, through Williamstown in the extreme northwest corner, and on to Troy, N. Y. One of the main cross-state arteries, Route 2, is being improved by relocating the portion from Concord west to Westminster. The relocation will be a dual highway with 24-foot roadways separated by a median strip. Short sections at the western end of the relocation, between Westminster and State Route 12 north of Leominster, have already been completed with dual roadways. Eventually the new alignment will cut across Fort Devens Army camp south of Ayer.

One of the contracts currently under construction on this 25-mile new location is the 4.3-mile Harvard-Littleton section east of Fort Devens. Grading of the dual road began in January, 1950, after the Massachusetts Department of Public Works awarded a contract to Carlo Bianchi & Co. of Framingham, Mass., on its low bid of $1,465,384.50. By the middle of September the grading and drainage were well enough along to start paving. The earthwork was finished last season, but the bituminous operations were halted by cold weather in the fall. The remainder of the paving will be completed this year.

The new cutoff will be a big improvement on the existing Route 2, which makes a sweeping arc through several small but congested towns and villages to the north. The narrow pavement and sharp curves on the old road made driving hazardous and slow. On the relocation, safety is stressed with such features as divided roadways for opposing traffic, broad stabilized shoulders, limited access, and no crossings at grade. A separate contract on the Harvard-Littleton section covers the construction of six bridges to carry cross-traffic over the main highway.

Dual Highway

The two 24-foot pavements are separated by a 20-foot median that is depressed to the center on 6 to 1 slopes, and covered with a 4-inch blanket of loam. The pavements have a center crown of ¼ inch to the foot, and are made up of a 2½-inch layer of Class I bituminous concrete Type I-1, laid in top and bottom courses, each 1¼ inches thick. Underneath the plant-mix is a 4-inch base course of penetration macadam laid on a 12-inch gravel foundation. This gravel foundation is carried out under the shoulders with a thickness of 15½ inches. Shoulders are 8 feet wide, sloping ⅜ inch to the foot, and are stabilized with a 3-inch covering of crushed-stone penetration macadam.

Cut slopes are 3 to 1 and fill slopes are either 2 to 1, or 4 to 1. In the cuts the slopes are covered with 2 inches of loam over a 2-inch layer of mulch. Embankments were built up in 3-foot layers of rock fill, and in 12-inch lifts where dirt was used. As the dirt was placed it was compacted to 90 per cent Proctor at optimum moisture. The principal drain-

(Continued on next page)

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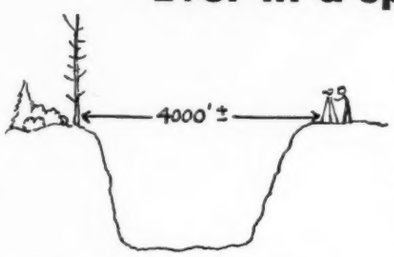
The Surveyor's Notebook

Reporting on Unusual Surveying Problems and Their Solutions

Notekeeper: W. & L. E. Gurley, America's Oldest Engineering Instrument Maker

Ever in a spot like this?



"'**Point your transits** toward Montreal and *get there, double fast!*'—those were orders," recalls Gordon E. Ainsworth, Whately, Mass., surveyor on the original Portland-Montreal oil pipeline, completed in record time back in 1941. "We worked in the field 12 to 14 hours, 7 days a week—through unmapped swamps, mountains and virgin wilderness of northern New Hampshire and Vermont.

"One miserably hot day we hit 'blowdown' in the most impenetrable country I've seen in 21 years of surveying. Levels showed our original line, following a winding mountain road, was 130 feet above the hydraulic gradient established by Humble engineers. Relocating, we faced a deep, wide ravine. Pipe stringers were hot on our heels—there was no time for cutting lines.

"We decided on an approximate check, by stadia, of the elevation on the far side. No rod was available, but hurried reconnaissance turned up a tall beech on the opposite ridge. Exposing the entire length of trunk, we placed red flagging at its base, and aimed the lower cross-hair of our Gurley 'light-mountain transit' at the top of the band. Three of the boys climbed the tree and, at signals from my revolver, moved a second band, which I caught with the upper cross-hair. We got our reading (approx. 40') by taping the vertical distance along the trunk; found the ravine to be about 4000' across. After we carefully read the vertical angle and computed the difference in elevation between H.I. and base of tree, direct leveling gave us our proper location in relation to hydraulic gradient.

"We finished the survey for our 83-mile spread in 10 weeks. Oil was flowing the 236 miles into Montreal only 21 weeks after the first stake was driven in Portland!"

Ainsworth Uses Four Gurley Transits

Today, 10 years later, Ainsworth finds *this same Gurley Transit* "easy to handle...easy to adjust." Now surveying New England spreads on the natural-gas pipeline from Texas, he has 4 Gurley Transits on the job. One, purchased second-hand 15 years ago, is used for his most accurate work. "Since we base surveys on azimuths, the accuracy of the Gurley compass is especially important," he says. "Frankly, for land surveying or construction layout, there is no better instrument at any price."

Take a tip from Gordon Ainsworth's notebook. Learn about versatile Gurley Transits. Bulletin 50 gives all details.

SURVEYORS: We'd like your story for a future page in The Surveyor's Notebook. Just drop us a line....We'll contact you for details later.

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age items on the project consisted of 130 catch basins, 53 manholes, and 22,350 linear feet of concrete pipe ranging from 10 to 48 inches in size.

Most of the right-of-way is in rugged terrain, involving 95 acres of clearing and grubbing. Clearing was done under a subcontract by the New England Tree Experts of Boston. Many of the other items were also subbed out to others, such as portions of the grading, drainage, and rock work. On the latter, drilling and blasting was done by the Cabot Construction Co. of New York City, while the general contractor looked after the loading and hauling. Carlo Bianchi & Co. was also pushing another big job, Downsville Dam in New York State, at the same time it was working on the Massachusetts road contract.

Grading

The four big items in the grading consisted of 395,000 cubic yards of roadway earth excavation, 170,000 yards of rock, 168,000 yards of peat, and 804,000 yards of borrow. These quantities are based on the engineers' estimate. Best results in the peat excavation were obtained with a 1201 Lima dragline equipped with a 90-foot boom and a 3½-yard bucket. The peat was cast out, and part of it stockpiled for use later on the slopes.

Other excavating equipment used by both the general and subcontractors included four Bucyrus-Erie shovels—two 2½-yard 54-B's, one 2-yard 44-B, and a ¾-yard backhoe; three Thew-Lorain 1¼-yard shovels; and a 1¾-yard Northwest rig. Material was hauled in 18 bottom-dump Euclids averaging 13 yards a load, 9 Super C Tournapulls carrying around 11 yards each, 5 Sterling trucks with 14-yard bodies, and 14 other Sterlings holding from 7 to 10 yards a load. The Euclids were put on the longest haul—a one-mile trip from the largest borrow pit. The Tournapulls, snatched-loaded by Allis-Chalmers HD-19 tractors, worked on hauls averaging 2,000 feet. The trucks worked on shorter hauls, either along the roadway or from pits closer to the right-of-way.

Dozers for dirt work and leveling off the layers of fill included 9 Caterpillar D8's, 3 Allis-Chalmers HD-19's, and 2 International TD-24's. Compaction was achieved with a pair of Acme 14-ton 3-wheel rollers. Final shaping was done with two Austin-Western motor graders. Gravel for the foundation course was obtained from a pit adjoining the location, requiring hauls averaging 2½ miles. A Euclid loader saw service part of the time during the grading operations. When dirt-moving was at its peak, the contractor averaged 11,000 yards of material during an 8-hour work day.

Macadam Base

Crushed stone for the macadam base course was obtained from three sources: Holden Trap Rock, Holden, Mass.; Massachusetts Broken Stone Co. at Weston, Mass.; and the Winchester Stone Co. at Winchester, Mass. All the hauling was done with hired trucks, up to 24 in number, engaged on a ton-mile basis. The hauls averaged 22 miles one way, with the trucks carrying about 10 tons a load. The base stone, graded from 2-inch down, was laid by a new Apsco Model 125 spreader in lanes 12 feet wide and to a loose depth of 5 inches. The spreader operator exercised individual control on each of the two conveyors at the sides of the machine, regulating the flow of stone into the spreader box. The foreman regulated the adjustment of the screed bar to determine the correct depth.

The 5-inch loose-depth stone was compacted to a 4-inch thickness by the Acme 14-ton 3-wheel roller and a pair of Buffalo-Springfield rollers — a 3-wheel 10-ton and a 10 to 12-ton tandem roller. The base stone was next penetrated with OA-4 asphalt, applied in 12-foot lanes by a bituminous distributor at the rate of 1¾ gallons to the

(Concluded on next page)

C. & E. M. Photo

As an Autocar truck with a Heil body unloads 25 tons of plant-mix, an Adnun Black Top Paver lays the first course on Massachusetts State Route 2.

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GEAR-GREASOR

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Bituminous Concrete Paves Dual Highway

(Continued from preceding page)

square yard. All the surfacing work on the contract was done by John P. Condon Corp. of Watertown, Mass. The asphalt was delivered to the job in tank trucks by D. J. Cronin Corp. after being hauled from the Socony-Vacuum Oil Co. plant at East Providence, R. I.

After the penetration shot, the base stone was choked with keystone, graded from ¾-inch down and put on by a Buckeye spreader box. The smaller stone was also rolled in, and the base was then ready for the 2½ inches of bituminous concrete. The plant-mix was obtained from the Condon commercial plant at Dracut, Mass., a 20-mile average haul to the job, and delivered in trailer trucks holding up to 25 tons a load. The bituminous concrete was put down in two 1¼-inch courses by an Adnun Black Top Paver working in 12-foot lanes. Each course was rolled by a Buffalo Springfield 10-ton tandem roller.

Stone Gradation

The gradation of the three sizes of stone required on the project was as follows:

Sieve Size	Per Cent Passing		
	Base Stone	Keystone	Peastone
2¼-inch	100	....	....
2-inch	90-100	....	....
1½-inch	30- 55	....	....
1¼-inch	0- 15	....	....
1-inch	0- 5	....	....
¾-inch	....	100	....
⅜-inch	....	90-100	....
½-inch	....	40- 70	100
⅜-inch	....	0- 15	30-60
No. 4	....	0- 5	0-15
No. 8	....	....	0- 5

For the bituminous-macadam shoulders, stone 3 inches deep and 8 feet wide was laid by the spreader, and penetrated with 2 gallons to the square yard of OA-4 asphalt. The same size of stone as used in the base course was put on the shoulders. A seal coat was then put on the shoulders consisting of a ½-gallon application of OA-4 covered with peastone graded from ⅜-inch down. The bituminous subcontractor employed an average force of eight men, outside of truck drivers, on its part of the work.

Quantities and Personnel

The major items on the 4.3-mile dual-highway grading and paving contract include the following:

Roadway earth excavation	395,000 cu. yds.
Rock excavation	170,000 cu. yds.
Peat excavation	168,000 cu. yds.
Ordinary borrow	804,000 cu. yds.
Gravel borrow	119,000 cu. yds.
Crushed stone for base course	26,300 tons
Bitumen for base course	214,000 gals.
Crushed stone for shoulders	7,150 tons
Bitumen for shoulders	100,000 gals.
Bituminous concrete	16,200 tons

At the peak of construction, a force of 200 men was employed on the project by the general contractor and subcontractors. Carlo Bianchi & Co. was represented on the contract by Paul Bianchi as Superintendent.

For the Massachusetts Department of Public Works, Thomas Houlahan was Resident Engineer; Frank Cahill was Inspector in charge of surfacing. The Department is headed by William F. Callahan, Commissioner; Philip H. Kitfield is Chief Engineer. William C. Tuttle is Executive Assistant in charge of the Construction Division.

How to Run a Lathe

The new and revised 50th edition of "How to Run a Lathe" has been announced by South Bend Lathe Works, South Bend 22, Ind. The pocket-size handbook has 128 pages and over 350 illustrations. There are eleven chapters clearly written in nontechnical language the beginner can understand.

The text covers the correct installation and leveling of the lathe, grinding cutter bits, turning, boring, thread cutting, taper turning, drilling, reaming, tapping, machinability ratings, and cutting speeds for various kinds of steels; standard tolerances for press fits, running fits, push fits, and sliding fits; allowances for finish turning, filing, polishing, grinding, reaming, lapping, and honing; and tooling dimensions for South Bend lathes.

Edition 50 is available from the company—in a paper binding at 25 cents, or in imitation leather Fabrikoid binding at $1.00 a copy postpaid.

Asphalt Institute News

John H. Goshorn is now District Engineer for the Asphalt Institute of New York City. His headquarters are at 431 Main St., Cincinnati, Ohio, and his district includes Ohio, Indiana, Michigan, Kentucky, and West Virginia. He replaces Albert H. Hinkle, senior engineer in years of service on the district engineering staff, who was promoted to Division Engineer. Mr. Goshorn was formerly Assistant Chief Engineer for the Ohio State Testing and Research Laboratory.

"Naming" Your Equipment

A brochure describing Metal-Cals, a new permanent equipment-identification device, is available from C & H Supply Co., Metal-Cal Division, Boeing Field, Seattle, Wash.

Metal-Cals consist of a 0.003-inch thickness of aluminum foil anodized and dyed. They are backed with a high-tensile bonding material and can be applied quickly to any smooth surface of metal, glass, wood, paint, or enamel. The manufacturer recommends their use for applying names, insignia, numbers, etc., to operating equipment. The brochure lists features, limitations, sample uses, method of application, and test reports on the product.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 951.

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Connect under any pressure without tools.
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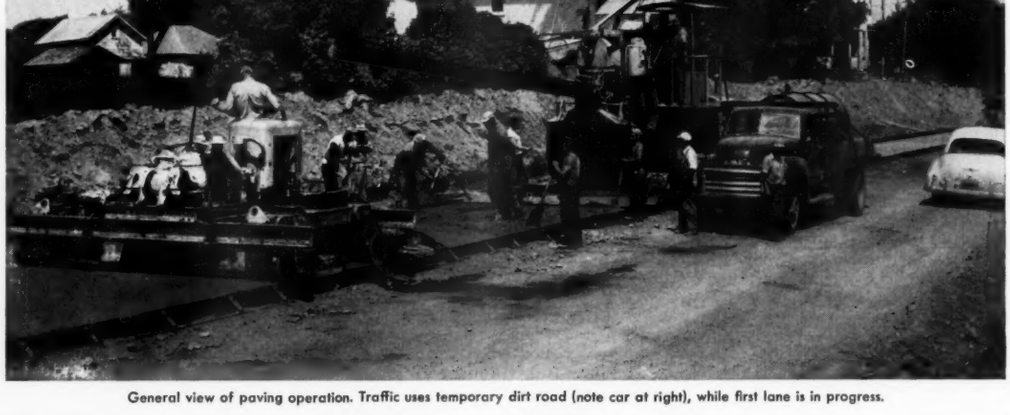
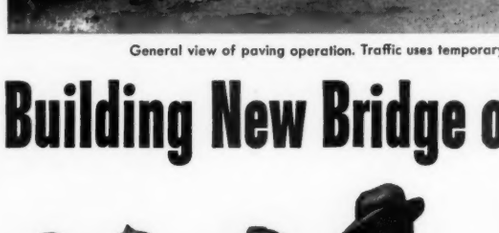
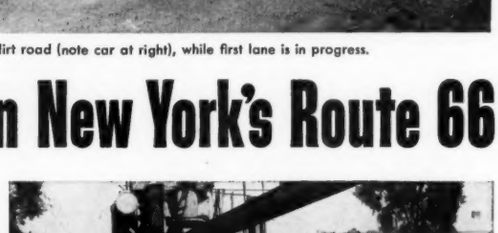


General view of paving operation. Traffic uses temporary dirt road (note car at right), while first lane is in progress.

Building New Bridge on New York's Route 66

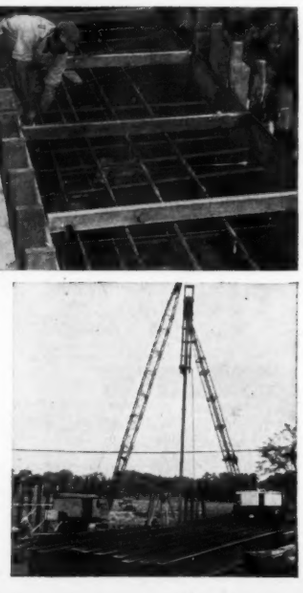


Left to right: L. R. Addis, inspector, New York State Highway Department; Nicholas Serafini, contractor; Peter Colarusso, materials contractor; and Jack White, superintendent.



These men are placing Bethlehem Hinged-Bar Mat over first course. The hinged mat folds over double, making it economical to truck, easy to install.

Bethlehem Reinforcing Bars in bridge abutment, getting final check before pouring of concrete.



Driving Bethlehem H-Piles to provide firm foundation for bridge. Bethlehem Structural Steel, shown in foreground, is ready for placing.

To eliminate a hazardous section of busy Route 66, the New York State Highway Department authorized the relocation of approximately a half-mile of this 2-lane highway near Hudson, N. Y. The project, consisting of a bridge over Claverack Creek, plus approaches, was handled by Serafini Construction Co., Binghamton, N. Y., and is shown in part in the accompanying photographs. Bethlehem furnished steel piling, reinforcing bars, structural steel and bar mats.

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Hollow Drill Steel • Spikes • Bolts and Nuts
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BETHLEHEM STEEL

The center-hole construction of the new Simplex Re-Mo-Trol remote-control hydraulic rams eliminates most of the rigging usually needed for pulling axles, pins, liners, etc.

A Center-Hole Ram Simplifies Pulling

The center-hole construction of the new remote-control hydraulic rams developed by Templeton, Kenly & Co., 1020 S. Central Ave., Chicago 44, Ill., simplifies many contractors' jobs such as pulling axles, pins, liners, and shafts, and prestressing concrete. The Simplex Re-Mo-Trol eliminates most of the rigging usually needed, the company says.

Tubular ram construction allows a center pulling screw or rod to be inserted through the center hole and secured to the object to be pulled. As the ram plunger extends, the rod is drawn through the ram, which supplies its own back-up. Re-Mo-Trol units may be used with pulling brackets and lateral pull rods, as well as for shoring applications, lifting equipment, testing soil load-bearing ability, aligning beams, etc. Remote control insures maximum operator safety and enables application where lack of space prohibits use of self-contained units, the company says.

Complete Re-Mo-Trol units consist of pumps and rams, with necessary connecting hose. A variety of auxiliary attachments may be had. Capacities are from 10 to 100 tons. All units are portable.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 910.

Bituminous-Paver Booklet

The Model BP-5 bituminous paver is featured in a new catalog prepared by The Jaeger Machine Co., Columbus 16, Ohio. It is adjustable while in motion to any width from 9 to 12½ feet and adjustable for lesser widths down to 5 feet 6 inches. It can lay thicknesses up to 6 inches in widths up to 11 feet, and thicknesses up to 4½ inches in widths up to 12½ feet.

Photographs show how the machine automatically lays pavements to match the level of an adjacent course, curb, gutter, or other structure. Other photos show the development of the Jaeger units starting with the original paver made in 1934. Complete data are given on the construction and operation of the BP-5, along with detailed specifications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 897.

Atlas Promotions

Paul T. Evans, formerly Manager of Pittsburgh District sales for the Explosives Department of Atlas Powder Co., Wilmington, Del., was made Assistant to the Director of Sales on April 1. James L. Wetzel, former Assistant Manager, succeeds Mr. Evans.

Vulcan Tools

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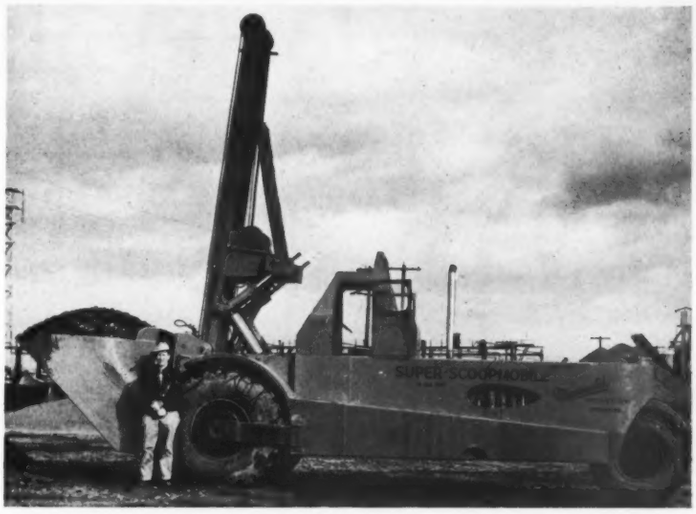
Large-Sized Scoop

The Super-Scoopmobile, a large materials-handling scoop, has been announced by Mixermobile Manufacturers, 8027 N. E. Killingsworth, Portland 20, Oreg. The bucket has a level capacity of 5 cubic yards, the tires stand nearly as tall as a man, and the whole machine weighs more than 18 tons.

The heavy-duty transmission provides 4 speeds forward and reverse. It is powered by a 4 to 1 planetary drive axle from a 250-hp diesel engine. The track tilt has hydraulic control and the carriage can be operated with the track in any position.

The Super-Scoopmobile can be used for elevating and pouring concrete, loading and shoveling dirt and bulk materials, lifting heavy equipment, and other heavy-duty lifting and transporting operations.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 880.



The bucket of the new Super-Scoopmobile has a level capacity of 5 cubic yards. The materials-handling machine weighs over 18 tons. Notice the height of the tires.

On heavy-duty conveyors . . .

IT'S TIMKEN®...

These 23" and 30" Rex conveyors built by Chain Belt Company have been in service more than 10 years. Idlers use Timken bearings.

AND TIMKEN

Four-belt, limestone-carrying conveyor system built by Barber-Greene is 3,795 feet long, uses 8,566 Timken bearings.

AND TIMKEN AGAIN!

This Stephens-Adamson conveyor system on Timken bearings handles up to 1,000 tons of rock per hour.

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1. THOROUGHLY PROVED. Timken® is the only tapered roller bearing proved by 15 years or more of service in heavy duty conveyor installations using the popular dead shaft construction.

2. EXTRA CAPACITY. Line contact between rollers and races gives Timken bearings high load capacity. And by using Timken bearing sizes that are mass produced for the automotive industry you get extra capacity bearings that actually cost *less* than the smaller sizes you'd normally use.

3. LONG-LIFE LUBRICATION. Not just lubricated for "life" but lubricated periodically as conditions require to insure *long* life. Fresh lubricant at regular intervals ends gummy, sticky, jammed bearings.

4. FRICTION MINIMIZED. Timken bearings' true rolling motion and extremely smooth surface finish practically eliminate friction.

5. LONGER ROLLER AND BELT LIFE. Less sliding and scuffing between idlers and belt.

6. MAINTENANCE REDUCED. Long life and dependable performance of Timken tapered roller bearings cut maintenance to a minimum.

Remember "Timken" is not a bearing type. It is a trademark applying only to bearings made by The Timken Roller Bearing Company. Always use Timken bearings in your conveyors. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

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TAPERED ROLLER BEARINGS

Typical application of Timken bearings for conveyor idlers.

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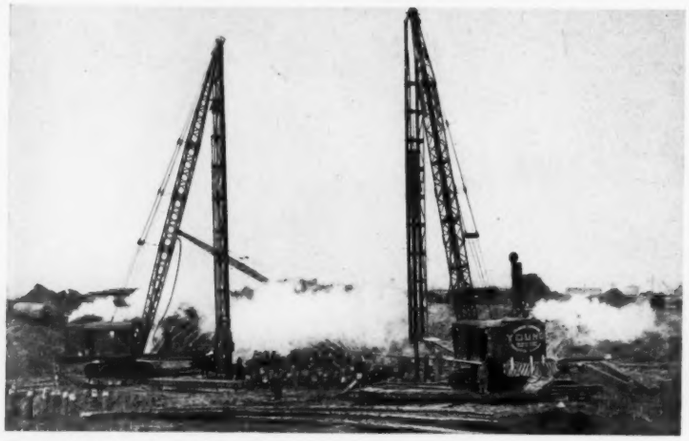
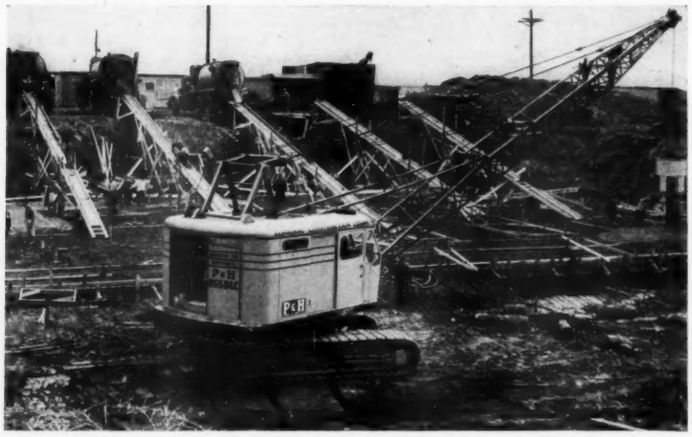
Sewage Plant Built in Meadow

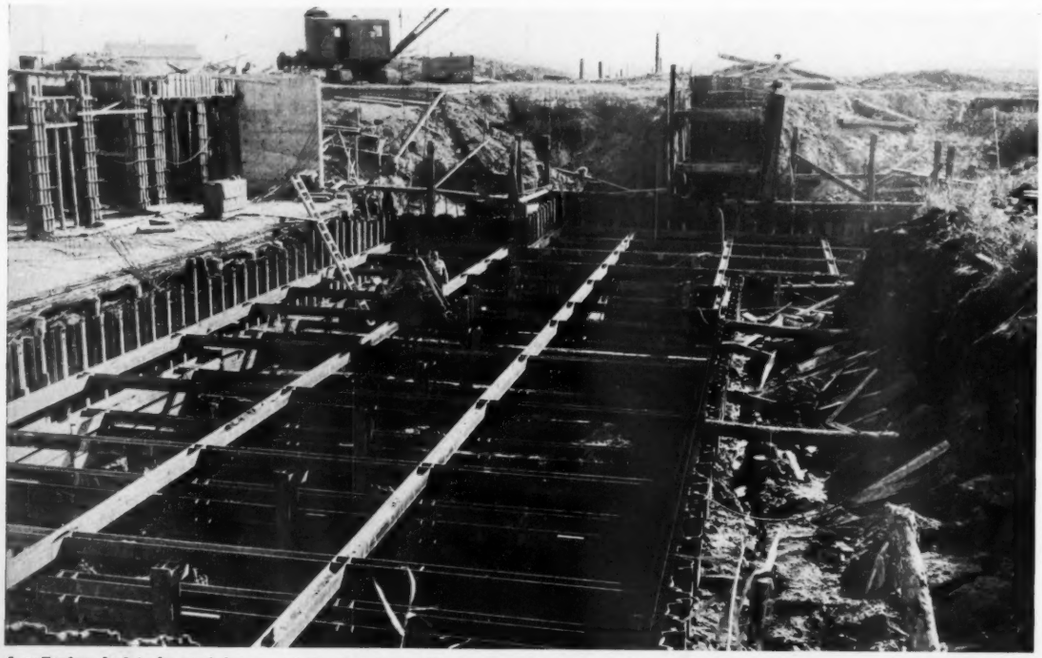


The four digester tanks of the plant rest on timber piles. Here are two of the Bucyrus-Erie steam driving rigs, using Vulcan pile hammers in their steel hanging leads.



Concrete for the base slabs of the tanks chutes down from Rex truck mixers, while a P&H crane, operating on mats, swings a Blaw-Knox bucket out to a hard-to-reach spot.

The job included six aeration tanks. Their complicated division walls, which were designed in an hour-glass section for operational purposes, posed difficult forming problems. Note all the reinforcing steel. *Terminal Construction Corp. Photos*



A cofferdam had to be used for one of the structures—the pump and blower house. The base slab of the structure will be 38 feet below the Hackensack River, only 180 feet away. Moretrench wellpoints around the coffer permitted work in the dry.

Running Ground and Shifting Forms, Water Infiltration and Muck up to the Knees, Were A Few of the Problems

By MICHAEL A. SPRONCK,
Associate Editor

• THERE are plenty of problems to plague a contractor when he has a $4,500,000 contract to build a modern reinforced-concrete sewage-treatment plant in the bogland of the Jersey meadows. Working in muck up to their knees, men had to contend with running ground, shifting forms, water infiltration, and all the other difficulties usually allied with poor soil conditions. But problems are what make jobs interesting, and contractors' know-how is the reason we're still building things by the contract system.

The plant is part of a $12,500,000 program of the Bergen County Sewer Authority for construction of sewage-collection and treatment facilities for 11 communities in Bergen County, N. J. Stage 1 of the program includes 11 miles of trunk sewer lines, 9 miles of intercepting sewers, incidental structures and facilities, and the $4,500,000 treatment plant in Little Ferry, N. J.

A major item in the program is the plant, which is designed for activated-sludge treatment. It was let under five separate contracts. Contract No. 1, constituting the principal portion of the work, was awarded to Terminal Construction Corp. and Young Foundation Corp., of Wood-Ridge, N. J., for $4,250,000. Contracts 2 to 5 inclusive accounted for the remaining $250,000 cost of the plant. These were for structural steel, electric equipment and wiring, heating and ventilating, and plumbing—which are required by New Jersey State law to be separate. Work was started in October, 1949, with two years allowed for completion.

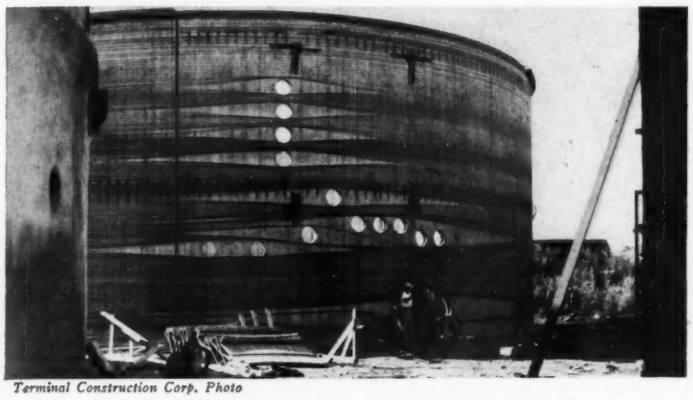
One of the reasons for selecting an activated-sludge type of plant was its compactness, thereby limiting the number of piles required. The plant itself covers an area approximately 400 x 1,000 feet. Component structures include the pump and blower house; four primary settling tanks with a total area of 102 x 137 feet; six aeration tanks covering an area 201 x 302 feet; four final settling tanks which, with the chlorination chamber, take up 173 x 196 feet; four 80-foot-diameter sludge-digestion tanks; and a sludge lagoon pumping station. Some 7,000 piles were used to support these structures.

Work Started in Muck

The job to be done was a big one and the first problem was getting the equipment out to the 188-acre site, which

(Continued on next page)

Swampland



Terminal Construction Corp. Photo

The core walls of the digester tanks were prestressed by the Pre-Load Corp. The prestressing cable was threaded around the wall openings which are for pipe sleeves leading to the sludge-control chamber between the four tanks.

C. & E. M. Photo

Principals on the job, left to right: Chief Inspector Tony DiIorio; R. N. Dinallo, who is President of Terminal Construction Corp.; Resident Engineer Robert Lincoln; and General Superintendent John Dioguardia.

was in the center of the Jersey meadows, about 200 feet from the Hackensack River. The concrete road from town stopped about ¼ mile from the near side of the project site, and it was doubtful that the swampland bog would hold more than the 220-pound weight of the job super, John Dioguardia.

There was 10 to 15 feet of muck overlying 60 to 80 feet of soft plastic varved clay with sand lenses. Between this and bedrock was a 10-foot layer of highly consolidated clay, sand, and gravel resembling hardpan. The contractor brought in a couple of P&H cranes and started building access roads. As fast as the 2-yard Page dragline buckets scooped out the muck and dumped it to the side, trucks dumped in firm new fill. About 1,500 feet of road was built this way, then another 3,000 feet was built around the job site—acting as a combination access road and embankment enclosure for the entire job. Over 75,000 cubic yards of bog was removed and displaced. The backfill, 61,000 yards, was brought in with twenty 10-yard dumps. Dodge Power Wagons, Mack Bulldogs, and some U. S. Army front-wheel drives were used to maneuver and dump in the axle-deep bog.

Pile-Driving Operations

First structures to be tackled on the

(Continued on next page, col. 3)

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Sewage Plant Is Built In Meadow Swampland

(Continued from preceding page)

job were the four 80-foot-diameter digester tanks. The site for these posed a little problem since it was in a garbage fill. The combination of loose material and high water content made excavation to proper size and grade difficult. The tank bottoms were designed as inverted cones, rather than flat slabs, and the job of keeping a 1 on 4 slope was next to impossible in this ground. Installation of about 400 Moretrench wellpoints solved the problem by drying the bottom and stopping the ground run.

The first of the piles were driven in this area; 440 were required for each of the four tanks. Over 7,000 with a total length of 466,720 linear feet were used for the entire job. The piles were 12-inch or larger, untreated-timber, driven to an average depth of 65 feet. Maximum depth was 80 to 85 feet. Pile driving was accomplished with 4 Bucyrus-Erie steam rigs. Vulcan driving hammers were set in steel hanging leads. The point-bearing piles were driven until they developed a bearing load of 20 tons per pile. Pile cutoffs were made with the 4 Mall chain saws.

The piles for the digester tanks were set about 4 feet apart on a series of circles each 10 feet larger than the one inside. The job of maintaining a 3⅛ on 12 floor surface, with circular caps to be formed over 440 piles, was a tough one. After the slab for the first tank was placed, the contractor decided time and money could be saved if the pile caps were eliminated by adding an extra foot of concrete to the base—if it was O. K. with the resident. It was. The cost of the extra yardage of concrete required for the three remaining tank bases was offset by the saving in time and labor.

The rest of the tank was constructed without difficulty. Slip forms were used for pouring the 32-foot-high 10-inch core walls. The core was prestressed by the Pre-Load Corp., New York, with a 1½-inch Gunite cover applied over the cables for protection. A 4-inch brick wall was placed around the tank with a 3-inch air space left to provide insulation. Floating steel covers will be used on the tanks.

Ready-Mix Concrete Used

A total of 24,000 cubic yards of 3,500-pound concrete was required for the job. Lehigh Type 2 cement was used because of its moderate resistance to the deteriorating effect of the sewage. A 1:2:3 mix proportion was used with a water-cement ratio of 6 gallons per sack. Concrete slump ranged from 3 to 5 inches for the various pours. Daily pours averaged 300 to 400 yards. The maximum pour was 652 cubic yards, placed during a 6-hour shift. Darex air-entraining agent was added at the concrete plant with a measuring bowl. From 3 to 6 per cent entrained air was specified. The entrained-air determination was made on the job with an Acme meter. Water curing was applied throughout.

Ready-mix concrete for the entire job is being supplied by the Hackensack Division of Samuel Braen's Sons. The plant is all electrically controlled. It consists of a 1,000-barrel bulk-cement bin, a 400-ton aggregate bin, a 5-yard batcher—all Blaw-Knox equipment—and a Howe dial scale. It was com-

(Continued on next page)

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pletely designed by William J. Maher, Division Manager, and has a maximum output of 100 cubic yards per hour. A 220-foot 24-inch conveyor, powered by a 40-hp engine, brings the materials up from the 3,000-yard gravel and 2,000-yard sand stockpiles to the aggregate bin. A fully automatic 150-hp Cyclotherm steam generator was installed for continuous operations throughout the winter. This unit provides 3,000 gallons of water at 180 degrees F every hour, Mr. Maher says, and is a great asset.

A total of 3,250,000 pounds of Ryerson reinforcing steel was installed in the various structures. A special contractor rig handled the steel and other materials on the job. It consisted of a Caterpillar diesel D7 with a rear-mounted A-frame of 6-inch pipe 25 feet long. The A-frame and hoist line were both live and able to lift and carry 6 tons.

Concreting Operations

Concrete pours were made with the same two P&H cranes used for the excavation. The 855-BLC crawler was fitted with a 100-foot boom and carried a 1½-yard Blaw-Knox bottom-dump bucket. The 255-ATC truck-mounted unit was fitted with an 80-foot boom and 20-foot jib, carrying a ¾-yard bucket. Long reaches were needed on this job since the cranes had to spot their buckets from the access roads that ran around the proposed structures. Pete Lojewski, who was in charge of the equipment on the job, had a 5-ton counterweight bolted to the tail of the crawler crane to give it better balance on the long reaches. He also had a small Homelite gasoline-powered generator, side-mounted, for lighting the boom and bucket at night.

Because of the extremely wet ground conditions, the contractor was compelled to move all equipment on mats or slabs which had already been placed —large and strong enough to carry the weight of rolling concrete trucks and cranes. Outside walls were constructed their entire length first, in order to create a reinforced-concrete cofferdam and thereby protect all field equipment from tidal waters and storms which might have risen at any time from the nearby river. The outside wall and the base slabs were poured, advancing from the north to the south end of the job. With the equipment at the south end, the contractor then retraced his steps, performing the balance of the work—construction of the intermediate dividing walls for the tanks, roof supports, etc.

Plenty of trouble was encountered in pouring the 900-foot outside walls. One set of wall forms shifted twice before the pour was even started. At first the contractor had used standard bracing on the exterior forms: diagonal 2 x 6's set to vertical stakes driven in the ground. When this didn't work, a stabilized alignment was obtained by lashing the form back to the reinforcement that had been set for the interior walls. Half-inch cables with turnbuckles were placed 12 feet on center and continually adjusted to keep the form in line during the pour.

Where overhead pours had to be made — reinforced - concrete framing members, building floor slabs, etc.—the forms were supported by adjustable Acrow steel shores. About 400 were used on the job. For the removable covering of the aeration-tank channels, precast-concrete slabs will be used. About 11,700 square feet will be required and will be cast on the job by the contractor.

The complicated division walls in the aeration tanks posed some difficult forming problems. The division walls were designed in hour-glass section for operational purposes. All curved ribs for the forms were fabricated on the job site from 2 x 6 and 2 x 8 boards. A ⅝-inch Plyform with sealed edges was used for facing. Sheets 4 x 8 feet were used, with studs placed 12 inches on centers and wales set 24 inches on centers. For the vertical walls 2 feet or less in thickness, 2 x 4's were used; over 2 feet, 2 x 6's were used. All forms were laced together with Richmond Snap-Tys. A form-cutting shop was set up on the job, using a 12-inch radial Skilsaw and a 20-inch C. H. & E. bandsaw for most of the work.

Contractor Buys Plant Equipment

Two of the heavier pours on the job were for the two foundations for the dual-fuel engines that will power the pumps and blowers in the plant. The foundations are 19½ feet deep, 9 x 12 feet in area, of mass concrete. Both of the engines will be 625-hp Dual-Fuel Worthingtons. They are designed to operate on the gas given off by the sludge digesters, but will also use diesel fuel if necessary.

The engines were purchased by the contractor, as was almost all of the other mechanical equipment for the final plant. "This factor was a great help in planning and staging the delivery of equipment to suit our needs", said R. N. Dinallo, President of Terminal Construction. This mechanical equipment is valued at over $1,000,000.

Cofferdam Used for Pump House

A cofferdam had to be used for one of the structures on the job—the pump and blower house. The wet well in the pump house is 38 feet below the surface of the Hackensack River, less than 180 feet away. The cofferdam is protected by about 240 Moretrench wellpoints which go down within 7 feet of the proposed base slab. The points are set about 3 feet apart and run around the perimeter of the sheeting—about 800 feet—on an 8-inch header. Two 8-inch pumps handle the dewatering: one an electric unit operating from a nearby 220-volt power line; the other driven by a Hercules gasoline engine.

The cofferdam consists of steel interlocking sheeting with all-steel bracing. Structural-steel 24 WF 100 beams are used for the wales; 10 WF 49 beams for the cross-braces. The sheeting was driven by an old Industrial Brownhoist steam rig. Welding of the steel members was accomplished with three welders powered by 300-amp dual-control welding generators supplied by Electric Arc, Inc., Newark, N. J.

Unwaters 43-Acre Lagoon

Another interesting aspect of the job will be the unwatering of a nearby lagoon which is to be used for disposal of the sludge from the plant. The final process of the plant is disposal of the sludge to a large drying area prefer-

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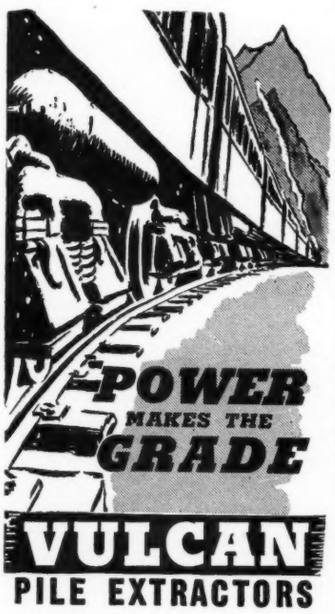

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Sewage Plant Built In Meadow Swampland

(Continued from preceding page)

ably near the plant. The lagoon which will be used for this purpose is an old clay pit now filled with 250,000,000 gallons of water. The lagoon has an area of 43 acres and a maximum depth of 40 feet in the center. It is expected to take care of all sludge deposits for about 50 years.

Unwatering this over-sized pond is included in Contract No. 1, and to accomplish the job, the contractor plans to use two 10-inch diesel pumps mounted on floating barges, with flexible discharge lines running from the barges to the Hackensack River. Unwatering will probably be done sometime early in the summer when weather conditions are favorable and there is little rainfall. After unwatering, the bottom will have to be sealed against local springs, and then the sand bed and drains will be placed. The pumps will stand by until this and the lagoon pumping station are completed.

Overall Plan

Plans for this overall project were started in 1937 when the New Jersey State Department of Health issued orders to six of the present 11 participating communities to cease and desist polluting the nearby waters. These waters include Overpeck Creek and the Hackensack River into which it flows. Both are tidal and rather sluggish streams. The daily incoming tides would float much of the sewage upstream, causing extremely undesirable conditions. Plans for treatment were delayed, changed, and then delayed again by World War II.

The plan for Stage A of the Bergen County Sewer Authority's program includes 11 communities with a total population of about 113,000. The expected quantity of sewage for the first few years is 11,000,000 gallons per day. Design, however, provides for a capacity of 20 mgd, with treatment by the activated-sludge process. Location on the 188-acre site provides for future expansion to 60 mgd when the other stages are completed. Total value of the 18 separate contracts on Stage A is $9,382,400. Contracts 6 to 18, inclusive, are for the sewer lines and incidental facilities. Contracts 1 to 5 were for the $4,500,000 treatment plant.

Treatment Process

The treatment plant—and all other portions of the project—was designed by Bogert-Childs Engineering Associates, New York, consulting engineers. An activated-sludge treatment was selected since it provides the necessary oxidative process for meeting the effluent requirements and yet requires a limited amount of land.

The sewage will come to the plant through a 60-inch trunk line, and pass through the mechanical trash racks and into the wet well. Here it will be raised 40 feet to provide for gravity flow through the remainder of the plant. It will enter the grit chamber first, for removal of the heavier solids, and then pass into the primary settling tanks where the treatment for sludge removal begins. There are four of these tanks, with a detention period of 1 hour. From here the sewage will pass through the six aeration tanks where the principal portion of the "work" will be done on the sewage. During the flow through these tanks, air will be blown through the liquid through porous tubes hung from the dividing walls. This will aid the natural biochemical activity of the sewage and speed the process. After passing through the air-contact region, the sewage will flow to the four final settling tanks for a 2½-hour detention, and then to the chlorination chambers before disposal in the river. The chlorine contact time will be ½ hour. The effluent discharged into the river will contain not more than 30 parts per million suspended solids, a BOD not greater than 30 ppm, and will be practically free of coliform bacteria.

In this process a portion of the sludge collected in the final settling tanks will be returned to the aeration tanks, to improve the efficiency of operation. The portion that is not needed for this will be delivered to the four 80-foot-diameter sludge-digestion tanks. About 30 per cent of the solid material will be converted to gases and liquids, thereby reducing the amount of material to be handled. Gas given off by the digestion usually contains about 75 per cent methane and will be used as a fuel supply for part of the power required in the plant.

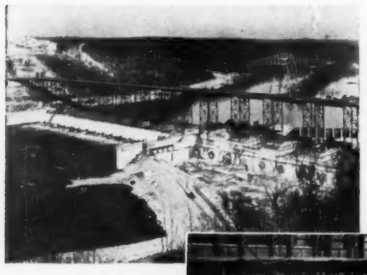
Personnel

Robert A. Lincoln is Resident Engineer for Bogert-Childs Engineering Associates. Tony DiIorio is Assistant to the Resident and Chief Inspector on the job.

R. N. Dinallo, President of Terminal Construction Corp., is directing the overall work on Contract 1. John B. Dioguardia is General Superintendent; E. N. Wooley, Chief Construction Engineer; and George Gyongya, Chief Field Engineer. Other supers include Pete Lojewski, Andrew Mulick, and Walter Hering.

The maximum number of men on the job at one time was 250. A single 5-day shift was used, except for the initial work on the cofferdam for the pump and blower house. Here two 8-hour shifts were used during the sheet driving.

Remember—Safety Is No Accident!



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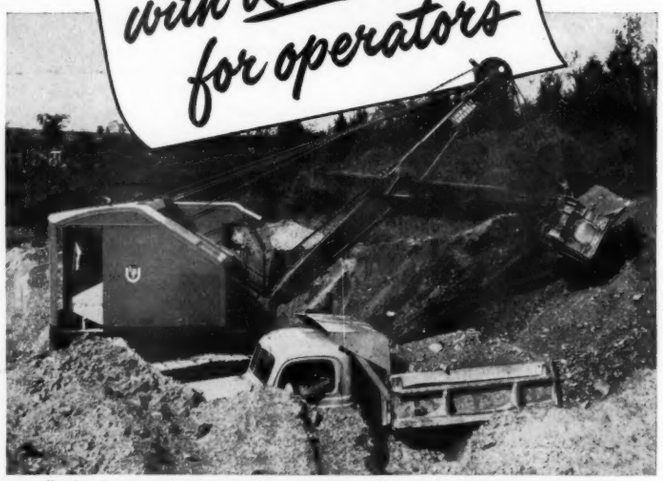
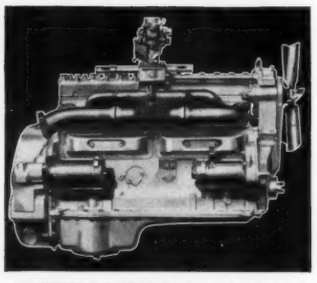


Keeping the trucks rolling to the crushers, near Wilson, Mich., this Link-Belt Speeder, powered by a 6-SRKR Waukesha Engine, is owned by Menominee County Road Commission, Menominee, Mich.

WAUKESHA POWER



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The engine shown is a Waukesha SRKR Six and operates on gasoline. It has a precision balanced crankshaft of drop forged steel, heat-treated, running in seven removable type precision bearings and is supported in a very deep *girder* crankcase for smoothness and freedom from vibration. With separate cast-en-bloc truncated cylinders, heavy-duty aluminum pistons, and matched connecting rods. Either with up-draft or down-draft carburetors the Waukesha Blue Flame Manifold gives lively throttle performance. Bulletin 1124 gives this engine's features in detail.

Waukesha *Diesel* Power, particularly for shovels, is described in Bulletins 1415 and 1532.

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WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN

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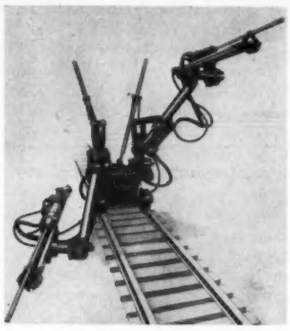


The Boom Jumbo—for high-speed driving of drifts, cross-cuts, and tunnels—can work in an opening with a maximum height of 10 feet and a width of 12 feet.

Jumbo Drilling Rig With Multiple Booms

A new Boom Jumbo drilling rig, designed for high-speed driving of drifts, cross-cuts, and tunnels, has been developed by Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. It can work in an opening with a maximum height of 10 feet and a width of 12 feet. The booms can also be purchased separately for mounting on jumbos for large tunnels.

Booms are raised or lowered into drilling position by I-R air motors, relieving the operator of all manual lifting. A self-locking worm gear operates a screw drive for raising or lowering the booms, preventing the booms from creeping or settling. Control valves for the air motors can be operated from either side of the boom, and power-feed and drill controls are also within easy reach of the operator. Booms are made of heavy seamless steel tubing with heavy vertical supports.

The booms may be swung in either direction by loosening one nut. When locked they are rigidly held in the desired position by a double-tapered clamp. Because the booms can be used with long feeds, it is possible to utilize fully the cost-saving features of Carset Jackbits, I-R claims. Two ceiling jacks, having a total rating of 32 tons of pressure, hold the jumbo in the desired drilling position regardless of overbreaks or high ceilings, Ingersoll-Rand says. An optional hydraulic ceiling jack is also available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 916.

Soils Engineers in Texas

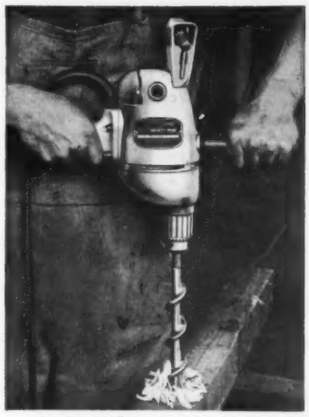
A new firm which will furnish geological and soil-mechanics technology to the engineering profession, and which will perform subsurface exploration, undisturbed sampling, laboratory testing of soils and rock, foundation analysis, soil-mechanics and geological studies, ground-water investigations, and airfield and highway pavement evaluation, has been formed by Raymond C. Mason, soils and foundation engineer, and Floyd T. Johnston, engineering geologist. The firm, Mason-Johnston Associates, is at 9915 Garland Road, Dallas, Texas.

Barricades of Rubber Guide and Control Traffic

Rubber cone-shaped barricades that look as if they are made of steel are effective traffic-control media, according to the new 2-page circular prepared by Interstate Rubber Products Corp., 908 Avila St., Los Angeles 12, Calif. It is this illusion of steel construction, says Interstate, that enforces traffic respect for Trafficones.

The circular points out that the design of the Trafficone places the center of gravity on a low broad base so that the cone cannot be knocked over easily. Other features include its light weight which facilitates placing and picking up, its shape which enables dozens to be stacked in a small place, and its brightly colored stripes which enable it to be seen at great distances. Illustrations in the circular show the many uses of Trafficones.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 892.



Van Dorn ½" Standard Electric Drill

Van Dorn POWER helps you finish drilling jobs FASTER!

Wherever you're drilling holes, in construction work or equipment maintenance, turn the jobs over to Van Dorn Electric Drills! You'll find them easier to handle; sturdily built to withstand rough usage; high-powered for non-stalling, trouble-free performance. 25 models from ¼" to 1¼" capacity in steel, double in hardwood. Drive twist drills, wood augers, Hole Saws. See your nearby Van Dorn Distributor for free demonstrations. Write for detailed catalog to: THE VAN DORN ELECTRIC TOOL CO., 787 Joppa Road, Towson 4, Md.

FOR POWER SPECIFY "Van Dorn" PORTABLE ELECTRIC TOOLS

(DIV. OF BLACK & DECKER MFG. CO.)

WANT TO CUT DOWN ON "worry smoking?"

JUST CONSULT THE BUTLER ENGINEER!

Costs rising? Labor shortage really making itself felt? Competition getting rough? Breakdowns costly and too frequent?

Well, BUTLER claims no cure-all,—but it very often happens that a conference with the BUTLER Engineer brings out some ingenious idea, or a suggestion or two, which leads to faster, more automatic operation, to cost-cutting procedures or to a smoother uninterrupted production flow. And after all, those are the answers to the questions that cause most "worry-smoking."

And of course, if you are buying a Road-builder Batching Plant . . . or a Ready Mixed Concrete installation, head-off your "worry-smoking" before it starts. That's when the BUTLER Engineer can serve you best.

CENTRAL MIXING PLANTS

BUTLER PLANTS are widely recognized as examples of brilliant engineering in a great variety of materials handling problems. Here the experience of the BUTLER Engineer is invaluable.

READY MIXED PLANTS

Ready Mixed Concrete Plants for every production level — engineered by BUTLER for the highest efficiency and lowest cost operation.

AGGREGATE PLANTS

Highly portable, quickly erected, BUTLER Aggregate Plants save time and money in meeting high pressure paving schedules.

BULK CEMENT PLANTS

A wide range of capacities for every roadbuilding job. Faster batching, split-pound accuracy. Shown is the CR-37-58 providing 650 bbls. capacity.

BUTLER BIN CO.
WAUKESHA, WISCONSIN

Use the ... PORTABLE SHELDON PUMP "you See When Tank Is Full"

★ Pumps 15 gallons per minute
★ Primes itself
★ Lifts Gasoline 15 feet
★ LONG LIFE (No Leathers)
★ Strains Fuel through Replaceable Strainer

CUSENBARY SALES CO.
CUNNINGHAM - - KANSAS

Accident Prevention Gets Its Just Reward

Winners in the 1950 Accident Prevention Contest sponsored by the Associated General Contractors of America, Inc., received their awards at the 32nd Annual Convention of the Association in Boston. Awards went to firms with over-average man-hour exposure and under-average man-hour exposure in the Association's Building, Highway, and Heavy Divisions—also for the best 5 and 10-year records.

Winners for the year ending September 30, 1950, in the class with over-average exposure were Madsen Construction Co., Minneapolis (first); Cleveland Construction Co., Cleveland (second); and Bryant & Detweiler, Detroit (third)—all in the Building Division. In the Highway Division, Koss Construction Co., Des Moines, Iowa, made first place; J. E. Haddock Ltd., Pasadena, Calif., came in second; and Burrell Construction & Supply Co., New Kensington, Pa., was third. Dravo Corp., Pittsburgh, had first place in the Heavy Division; T. L. James & Co., Inc., Ruston, La., second; and Maxon Construction Co., Inc., Dayton, Ohio, was third.

The awards in the group with less than 216,771 man-hours of average exposure were as follows: In the Building Division — Fretz Construction Co., Houston (first); Woermann Construction Co., St. Louis (second); and E. J. Cross Co., Worcester, Mass. (third). In the Highway Division—J. D. Armstrong Co., Inc., Ames, Iowa, was first; R. B. Burch, Inc., Cedar Rapids, Iowa, was second; and E. M. Duesenberg, Inc., Clear Lake, Iowa, was third. In the Heavy Division—C. F. Lytle & Amis Construction Co., Cambridge, Nebr., was first, and Jutton-Kelly Co., Dearborn, Mich., was second. J. E. Haddock, Ltd., placed third.

The firms with the best 5-year records received special awards. In the Building Division, those firms with above-average exposure which received awards were Newbery Electric Corp., Los Angeles (first); Southeastern Construction Co., Charlotte, N. C. (second); and J. A. Utley Co., Detroit (third). In the under-average-exposure class of the Building Division first place went to Martin L. Bauer Construction Co., Middletown, Ohio; second place to Woermann Construction Co.; and third place to A. L. Jackson Co., Chicago.

For the 5-year period in the Highway Division, George K. Werner & Son, Clay Center, Nebr., had the best record. Burrell Construction & Supply Co. stood second; and Daniel F. MacNamee & Co., Inc., New Rochelle, N. Y., was third.

The 5-year record in the Heavy Division was established by Herbert F. Darling, Williamsville, N. Y. The award for second place went to E. E. Barber Construction Co., Fort Smith, Ark., and The Fluor Corp., Ltd., in Los Angeles, took third place.

Firms receiving awards for the best 10-year records were H. B. Alexander & Son, Inc., Harrisburg, Pa., who took first place in the Building Division; H. P. Cummings Construction Co., Ware, Mass., second in that division; and E. J. Cross Co., third. In the Heavy Division, Maxon Construction Co. was first; Holmes Construction Co., Wooster, Ohio, was second; and Dravo Corp. was third. No firms were eligible for a 10-year award in the Highway Division.

There were 32 firms in the Building Division, 8 firms in the Highway Division, and 4 firms in the Heavy Division which received awards for reporting no lost-time accidents during the year.

Lima Appointments

Henry Barnhart, Vice President of the Baldwin-Lima-Hamilton Corp., is now General Manager of the Lima, Ohio, plant for the firm's Lima-Hamilton Division. J. F. Connaughton is Assistant General Manager. Both men have been with Baldwin-Lima-Hamilton since 1928.

POUR CONCRETE PIERS and COLUMNS
FASTER, CHEAPER, BETTER
with Sonotubes
LAMINATED FIBRE FORMS
FOR ONE-TIME USE
3" to 24" I. D. up to 25' long

REQUIRE MINIMUM BRACING

Easy to set up, align and brace—SONOTUBES provide a fast, cheap method of forming concrete piers and columns. They are for one-time use and can be left on or easily stripped off. Reinforcing beams or braces can be set in before pouring or placed in position after pouring.

SONOTUBES save hours of costly labor—eliminate expensive lumber and permanent forms.

PROVIDE PERFECT FINISHED COLUMNS

Write for complete information and prices.

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BETTER CURING AT LOWER COST with SISALKRAFT CURING BLANKETS

BEST WAY TO BETTER PROFITS

The SISALKRAFT Method of curing concrete roads is fast, requires fewer men, no equipment, and you're sure of:

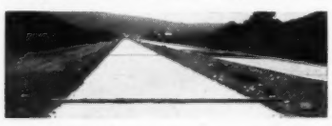
✓ Lowest possible final curing costs and best curing results.

✓ Fifteen or more re-uses of curing-blankets . . . just roll 'em up and use them again!

✓ The only waterproof, reinforced blankets designed to withstand rugged road-job handling.

Designed, Developed and Proved in Performance by Roadbuilders, for over 20 years

Photo above shows stringer sheets along edges of concrete, before laying SISALKRAFT *Curing Blankets (doubles life of blanket, simplifies covering and removing blankets, saves labor, improves results). Photo below: Pennsylvania Turnpike...* SISALKRAFT *used 100% for curing.*



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WORTHINGTON-RANSOME BLUE BRUTE MIXERS
CAN DISH IT OUT . . . and can take it, too

1. Water system—exclusive spiral cut-off syphon-type—no rubber to deteriorate.
2. One-piece semi-steel drum drive gear—machined inside to true circle.
3. Skip cable winding shaft mounted in self-aligning bearings—cable is self-equalizing.
4. Automatic clutch knock out and brake hold skip in discharge position when power loader is raised to top.
5. Skip vibrator speeds discharge—and it's self-cleaning.
6. Water-cooled engine. Radiator faces discharge side. Air-cooled also available.
7. Solid welded roller sub frame—no misalignment of rollers.
8. Two-piece discharge chute is out of way during mixing.

This line of concrete mixers will take a lot of banging around . . . yet will turn out the concrete for you—faithfully and fast.

The 16-S shown is built for the big jobs where you want your equipment portable. Look at those features. They add up to the fact that this mixer will *always come back for more.*

The 11-S, with two or four wheels, is also available. It is easily towed, easily turned.

See them all at your Worthington distributor. Worthington Pump and Machinery Corporation, Construction Equipment Division, Dunellen, New Jersey.

BUY BLUE BRUTES
WORTHINGTON

R1.6

First Atomic Reactor For Research Is Built

Reactor Made of 60,000 Blocks of Graphite, Machined Uranium, Steel Plate, and Special Concrete; Will Be Used for Research Only

• AMONG the problems posed by an atomic age are those involved in the construction of atomic reactors—and no one familiar with the construction of the nation's newest atomic reactor at Brookhaven National Laboratory, Upton, N. Y., is inclined to underrate these problems.

The reactor at Brookhaven is the first the United States has ever built exclusively for research. It can operate at any level up to its 30,000-kw capacity, and many different nuclear experiments can be carried on at the same time under carefully controlled conditions.

What Is a Reactor?

Brookhaven's reactor is a giant cube of graphite in which uranium is inserted in an exact pattern. Its primary purpose is to produce neutrons for scientific experimentation. A pile, or reactor, becomes in operation a vast reservoir of neutrons and a source of fission products, the radioactive substances into which uranium nuclei are split. When chemical elements are inserted in this pile and bombarded by neutrons, they become radioactive. Since some of these radioactive materials, or radioisotopes, decay by emission of rays or particles in a very short time (minutes, seconds, or less) Brookhaven's reactor has pneumatic tubes which whisk samples to be studied into the reactor and out to adjacent laboratories. These radioisotopes are important research tools in biology, medicine, agriculture, and engineering.

Foundation on Sand

The H. K. Ferguson Co. of Cleveland and New York, under the supervision of Wells N. Thompson, Vice President, handled the engineering design and construction of the reactor. It was an unusual undertaking.

The foundation problems, for which Professor D. M. Burmister of Columbia University served as consultant, are especially interesting for two reasons. First, the nature of the pile and the method of assembling the giant cube of graphite where the atomic reaction actually takes place required prediction of settlement and tilting of the foundation within very close tolerances. Second, the weight of the pile is so great that it caused stresses of more than one ton per square foot at a depth of 100 feet below the footing. The total weight of the pile—about 40,000,000 pounds including the foundation—produces a soil pressure of 6,500 pounds per square foot under the footing.

The foundation extends 35 feet below the surface. Borings and load tests were made to determine the elastic properties and load-settlement characteristics of the subsoil after the overburden was removed. The predicted total settlement was about 2 inches, and the actual total settlement was 1½ inches when measurements could no longer be made. Settling was compen-

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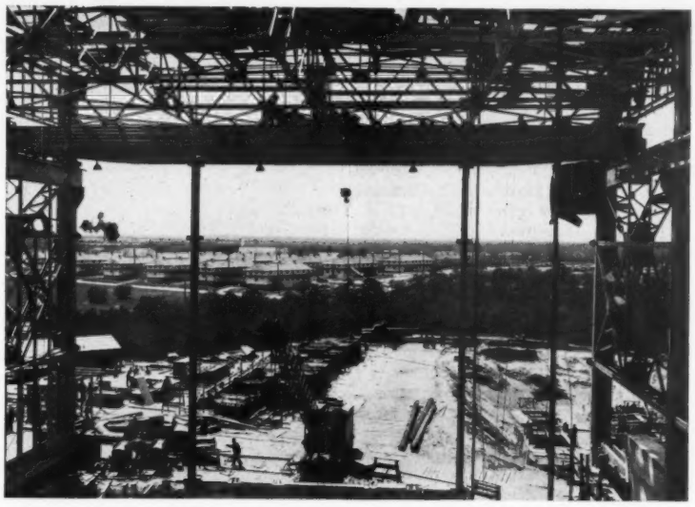

In this early stage of construction of the atomic research pile at Brookhaven, a 10-ton traveling crane to be used permanently in the reactor is already in place. It helped handle and install the armor plate shielding.

No other machine or method produces comparable results at comparable costs

The Moto-Paver *mixes and lays* a high quality bituminous mat in one continuous operation, effecting substantial savings in time and labor costs. Produces a smooth, waveless surface even when resurfacing over rough, irregular pavement. Uses beach sand, gravel, crushed stone or slag aggregates and various bituminous materials including tars, cut-back asphalts, road oils and emulsions.

Road speeds up to 25 miles per hour make it possible to move the Moto-Paver from one job to another in a minimum of time. Available in either standard or heavy duty models for handling all types of resurfacing, retread and stabilization jobs under all kinds of operating conditions.

See your local H & B distributor or write for Bulletin MP-49.

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First Atomic Reactor For Research Is Built

(Continued from preceding page)

sated for at the elevation where the base for the actual pile structure was laid, by correcting for tilting and by building the base higher by the amount of additional settlement to be expected. Since the base was sand, there was no plastic flow of soil to contend with.

60,000 Pieces of Graphite

The cube where the atomic reaction takes place is composed of 60,000 pieces of graphite, stacked one atop another like building blocks. There are 2,600 different sizes and shapes, and a drawing was prepared by Ferguson's engineering department for each of these variations.

For security reasons the machining of the graphite to very close tolerances had to be done on the job site. A Ferguson subcontractor, Liberty Products Co. of Farmingdale, Long Island, N. Y., did the work in a building once the gymnasium for Camp Upton. The gymnasium was first equipped with a complex dust-collecting system.

Ferguson forces stacked the graphite in the pile. There was no bonding material; instead, the individual blocks, some 4 feet long and weighing 50 pounds, were placed by using a keying system. Both external and internal forces had to be compensated for in the design of the graphite. The external forces are strong because of the pressure drop necessary to provide the large volume of air used to cool the pile; internal forces arise from the temperature differentials inside the graphite cube during the atomic reaction.

During the machining and stacking, the graphite had to be protected from contamination, particularly from contact with borax, an ingredient of most laundry soaps. Each workman was given a pair of white coveralls and six pairs of gloves laundered with borax-free soap every day. He was also furnished with basketball shoes to prevent slipping in the graphite dust.

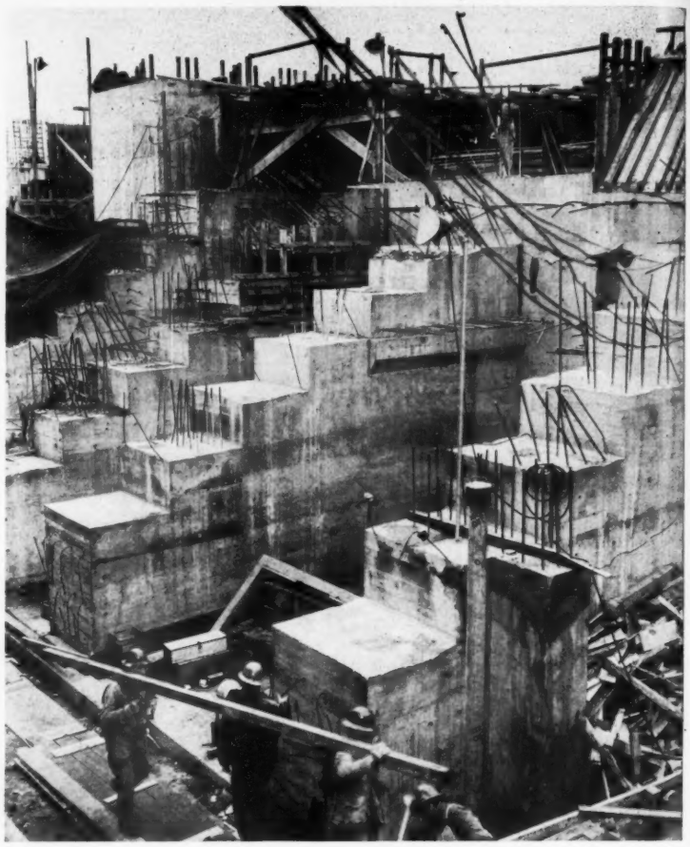
Uranium Machined

Uranium was machined under subcontract by Chapman Valve Co. of Indian Orchard, Mass. Security provisions for the handling of this material are extremely strict. It was brought to the site under armed guard, and the smallest fraction of a per cent had to be accounted for. Chips and grindings were always under the most careful control. In order to reduce the hazard to men working with this dangerous material, machining equipment was provided with hoods and exhaust ventilation and contaminated equipment was throughly cleaned or discarded.

Uranium is heavy—from 1,150 to 1,200 pounds per cubic foot—somewhat plastic, and extremely abrasive. It wore out cutting tools and inspection equipment very quickly. Machining and storage were planned to involve as little handling as possible, and special cutting compounds were used to keep the uranium from igniting while being machined.

The Pile Shield

The pile shield, which encases the graphite cube on all sides and protects personnel from radiation, is constructed of a special classified type of concrete, several feet thick, and steel plate ranging in thickness from 9 to 18 inches. The steel plate has a structural as well as a protective function.



To distribute the tremendous weight of the atomic pile at Brookhaven required careful design of the foundation. Here are buttresses being constructed for the foundation of the pile proper. Professor D. M. Burmister of Columbia University served as a consultant to The H. K. Ferguson Co. on the foundations problem.

Surplus heavy steel plate was obtained from the Panama Canal Zone because new material was not available at the time. The New York Naval Shipyard fabricated the plate in sections weighing about 10 tons each. The builders scheduled their work so as to have the pile's permanent 10-ton traveling crane in operation when the steel plate was ready to be set in place.

Many of the steel-plate sections are pierced by holes for control equipment, for uranium charges, and for experiments. These openings had to be fitted with special plugs. The sections were stacked one atop the other in the case of wall shielding, and side by side in the base and the top. They were then electrically welded.

The Cooling System

An extensive cooling system was required to remove the 30,000 kilowatts of heat generated within the pile during the fission process. In the fan house adjacent to the reactor building, centrifugal compressors were installed which can draw 300,000 cubic feet of air per minute through the pile cooling system. Air speeds vary from 40 miles per hour in the main ducts, two of which are large enough to accommodate a New York subway train, to

(Concluded on next page)

"Tag Master"

"Tops" in Bucket Control

As your clamshell "flies through the air with the greatest of EASE," watch the eyes of the "sidewalk superintendents" POP!

You, too, will be delighted with the EASE with which you *cast* the clamshell, or *snub* it, or *twist* it, getting into hard-to-reach corners and picking up hard-to-manage rocks.

You'll find the tagline pull *uniform* at all bucket levels and *adjustable* to fit any job.

In addition, you can use your TAG-MASTER as a *dipper-trip!*

Some of these advantages YOU NEVER HAD BEFORE . . . unless you have already used a TAG-MASTER!

For more details about this combination tagline winder and dipper trip, mail the coupon below.

MORIN MFG. CO., INC.
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PRESSURE DISTRIBUTOR

Featuring the New "Lite-Wate" Circulating Spray Bar

This "Spray Master" Pressure Distributor with the New Circulating "Lite-Wate" Spray Bar gives Contractors and Highway Departments the most efficient, low cost operating Unit ever devised.

The "Spray Master" operates with the minimum of labor, heats faster, has only one Valve for starting and stopping the spray.

This new "Lite-Wate" Circulating Spray Bar is *less than* ½ *the weight* of ordinary spray bars. It has quick acting couplings for adding extensions up to 24 ft. in width. Each nozzle can be turned off individually to give any desired spraying width. The "Lite-Wate" Circulating Bar is the latest in engineering achievements by Littleford.

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MANUFACTURERS OF
"Spray Master" Pressure Distributors—Trail-O-Rollers
"Spray King" Pressure Distributors—Emulsion Sprayers
"Kwik-Steam" Vapor Generators—"Vari-Packer" Rollers
101 Utility Spray Units—Tar Kettles—Asphalt Tools
"Tankar" Heaters—Road Brooms—Supply Tanks

hundreds of miles per hour in the small graphite passageways.

Ferguson made every effort to adapt existing industrial equipment to the requirements at Brookhaven. In the case of the fans, B. F. Sturtevant Division of Westinghouse worked with Ferguson to adapt one of its models.

Air is filtered before and after it leaves the pile, and is finally exhausted through a 320-foot reinforced-concrete stack tapering from 32 feet in diameter at the base to 19 feet at the top. A silencer was built into the ducts and the base of the stack to eliminate noise which would be disturbing in a laboratory setting. A secondary cooling system was installed so that the temperatures of the exhaust gases from the pile would not be higher than concrete can stand continuously.

A 500-ton refrigeration system was required for air conditioning the pile building and control areas, the pile laboratory, and an adjacent "hot" laboratory where radioactive materials are handled. Low humidity is needed in these buildings for process control of ambient conditions.

Security on the Job

The maintenance of strict security influenced organization and planning considerably. Every employee was investigated by the Federal Bureau of Investigation, a process which often took three months.

The labor force was divided into two groups: one made up of employees whose clearance was established, the other of employees whose clearance was pending. The project was divided into classified and unclassified areas, all of which were sealed off—some by temporary walls—and protected by armed guards who examined the credentials of all who entered. As clearances came through employees were issued new badges and transferred to classified work.

Security also affected the handling of materials. For instance, one batch plant which mixed the concrete used in the pile shield was operated under security conditions and was under guard as long as it was in use. Overages and wastes were destroyed in accordance with security regulations.

Safety Saved Money

An organized and effective safety program was maintained on the 3-year job and more than $300,000 in insurance costs was returned to the Government under the terms of the insurance contract covering the project. During 1948, a typical year of the 3-year program, Ferguson forces at Brookhaven suffered only 21 accidents involving loss of time. The accident-frequency rate was 6.89 disabling injuries per million man-hours worked, while the national average for general building construction for the same period was 31.99—almost five times greater.

During the course of the entire job, there were only 40 lost-time injuries, accounting for a loss of 792 man-days. The frequency rate for the job was 7.04 disabling injuries per million man-hours, and the severity rate was 0.14 days lost per thousand man-hours. There was not a single fatality or serious accident.

This record was made possible by an enforced safety program which included planning safe methods of construction in advance of actual operations; regular field safety inspections; use of safety equipment; and a safety incentive system among crafts.

Personnel

Scientific specifications for the atomic reactor were established by the Brookhaven reactor staff, headed by Dr. Lyle B. Borst. The contract under which Brookhaven operates is supervised by Wilbur E. Kelley, Manager of the New York Operations Office of the U.S. Atomic Energy Commission, and E. L. Van Horn, Manager of AEC's Brookhaven area. The Babcock & Wilcox Co. of Barberton, Ohio, served as engineering consultant in the final construction stages, along with David Rossheim and Addison G. Bissell, special consultants to the Atomic Energy Commission. The Servo-Mechanism Laboratory of the Massachusetts Institute of Technology at Cambridge, Mass., designed and engineered the reactor control system. H. K. Ferguson Co. handled engineering design as well as construction.

Portable Load Meter Gives Dual Service

The importance of maintaining our highways by aggressive law enforcement of weight restrictions makes all

A Hi-Way Loadometer weighing beam with cover plates removed, as used by the Ohio State Highway Patrol.

developments in this field of interest to highway men. One such development is the dual-service use of the Hi-Way Loadometer made by Black & Decker Mfg. Co., Towson 4, Md. This unit, originally designed for portable service and quick transport to any load-test site, may now be installed in a weighing pit where it is convenient to perform the test off the right-of-way.

The weighing pit consists of two Loadometers connected with a steel beam of a box-type cross section, thus making an axle-load scale. The company points out that though highway patrols find they can speed up operations using the Loadometers in fixed weighing pits, they lose the flexibility of operation inherent in a portable unit. The dual service of the Loadometer enables a highway patrol to use either one, or both, of the field methods.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 884.

Brief Data on Equipment

A pocket-sized condensed catalog of construction equipment is available from Athey Products Corp., 5631 W. 65th St., Chicago 38, Ill. It provides immediate reference to all Athey products and includes pictures and specifications. Products it describes include the Athey Force-Feed Loader; Forged-Trak trailers, wagons, and wheels; the MobiLoader; portable breakers; and rubber-tired trailers. Detailed catalogs on any of the pieces of equipment are also available.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 920.

Blom Is Byron Jackson V. P.

Carl Blom has been elected Vice President of the Byron Jackson Co., pump manufacturer of Los Angeles, Calif. He joined Byron Jackson in 1924 and in 1940 he became Chief Engineer of the Pump Division.

HERE IS THE MACHINE THAT HAS REVOLUTIONIZED CONCRETE SAWING

NEW Self-Propelled CONCUT CONCRETE SAW

CONCUT
THE GREATEST NAME IN CONCRETE SAWS

Today, concrete sawing is *big business!* . . . and the Self-Propelled CONCUT is the machine to handle this business *faster, easier* and *cheaper.*
The Self-Propelled CONCUT brings a new high in efficiency for all of your concrete and asphalt sawing jobs. The Self-Propelled feature, the Finger-Tip control, the exclusive Lever Lock are some of the engineering features, which mean substantially lower blade costs . . . virtual elimination of operator fatigue and fewer manhours on the job.

● *More and more cities are specifying "sawing before breaking." Contractors and engineers are becoming increasingly aware of the advantages and long-range economy of "sawing before breaking," wherever concrete or asphalt is removed. • NOW is the time to get full details on the Self-Propelled CONCUT . . . Write for Bulletin 12 today!*

CHECK THESE BIG CONCUT FEATURES

SELF-PROPELLING . . . virtually operates itself, gives you anti-fatigue sawing, longer blade life and fewer manhours on the job.
FINGER-TIP CONTROL . . . Spindle speed tachometer, water pressure gauge, transmission control lever, motor shut-off and motor throttle located on dash panel directly in front of operator.
LEVER LOCK . . . enables operator to remove blade from cut, then lower to same cutting depth without changing adjusting screw.

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Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Mistaken Bids May Be Withdrawn Where Error Evident to Authority

• SOMETIMES a bid is so far below the next high bid and the engineer's estimate as to indicate a probable mistake. For example, low bid on a sewer job was $429,444.20. The engineer's estimate was $632,000; the second bid was $671,600; and the remaining bids ranged from $673,832 to $1,217,799. It developed that the contractor had inadvertently omitted a steel-reinforcement item costing $99,225.68.

A lower court in this case permitted the contractor to withdraw his bid and requested the City to return his $21,472.21 bid deposit. Later the Oregon Supreme Court upheld this judgment. (Rushlight Automatic Sprinkler Co. v. City of Portland, Oreg., 219 Pac. 2d 732.)

The court's opinion is interesting. It mentions the inclination to condemn haste in preparing bids and to require "such methodical care that error will be virtually eliminated". But it adds that such a requirement must yield to the "realities of life", to the fact that contractors who compute estimates do not work under ideal conditions.

The court concluded that although the contractor alone made the mistake, the City was aware of it. And when it accepted his bid with knowledge of his mistake, "it sought to take an unconscionable advantage of an inadvertent error." Courts, said the Oregon bench, are always prepared to grant relief from such situations.

Other Decisions

The court's opinion cited decisions of other courts throughout the country on the right to withdraw mistaken bids.

Bidders on a city water-main job, for example, inadvertently used the weight per foot for pipe instead of the price per foot in preparing their bid. The result was a bid of about $6,000 less than intended. However, they discovered their mistake five hours after the award of the contract and promptly notified the city attorney. (Bromagin v. City of Bloomington, 84 N. E. 700.) The court's decision that the bidders could withdraw their bid and recover their deposit was influenced by the fact that the city officials were aware when they opened the bids that a mistake had probably been made.

The United States Supreme Court upheld the right of a bidder on a municipal job to withdraw his bid and deposit when mistakes were discovered and pointed out by the bidder's engineer at the time the proposals were opened. (Moffett, Hodgins & Clarke Co. v. City of Rochester, 178 U. S. 373.)

However, in another case (Tony Amodeo Co. v. Town of Woodward, 185 N. W. 94), the low bidder on a street improvement discovered a mistake in his bid but indicated he would proceed. Later he tried to back out, but the Iowa Supreme Court ruled that he could not—even though city authorities sensed he had made a mistake when the bids were opened, and probably would have permitted withdrawal had he asked for it promptly.

Related Cases

Two cases cited by the Oregon court involved "mistakes" of a sort though not precisely parallel to the Oregon case. In one, a bidder on a city job tried to withdraw his accepted bid on the ground that the proposed contract contained some ambiguous provisions, though the form of the contract was incorporated in the call for bids (McCormick v. City of Uniontown, 55 York Rep. 55). The Pennsylvania Court of Common Pleas ruled that he could not withdraw it; he should have had the ambiguity cleared up before he placed his bid.

A bidder on a street improvement at a price of $37,694 discovered before the contract was awarded to him that some of the excavation required would be through rock, and not earth as he had assumed. The City submitted a contract to him stating the price at $48,600. He refused to sign it and the City forfeited his deposit (Tunny v. City of Hastings, 141 N. W. 168). The Minnesota Supreme Court said he was entitled to have his deposit returned. It reasoned that the parties had abandoned the contract called for by the bid, on the ground of a mistake in making the bid; and that the City never indicated any intent to hold him to his bid.

Withdrawal for Other Reasons

Two of the cases cited dealt with attempts to withdraw bids on grounds other than mistakes. A bidder on a park improvement asked for release on the grounds of illness and a doctor's advice that he retire from contracting. The court ruled he was not entitled to the release. (West Chicago Park Commissioners v. Carmody, 139 Ill. App. 635.)

A bidder on a street improvement refused to contract when the bid was made, on the ground that no special assessment of property existed to defray the cost. He was not entitled to refuse, the Illinois Supreme Court said (Village of Morgan Park v. Gahan, 26

(Continued on next page)

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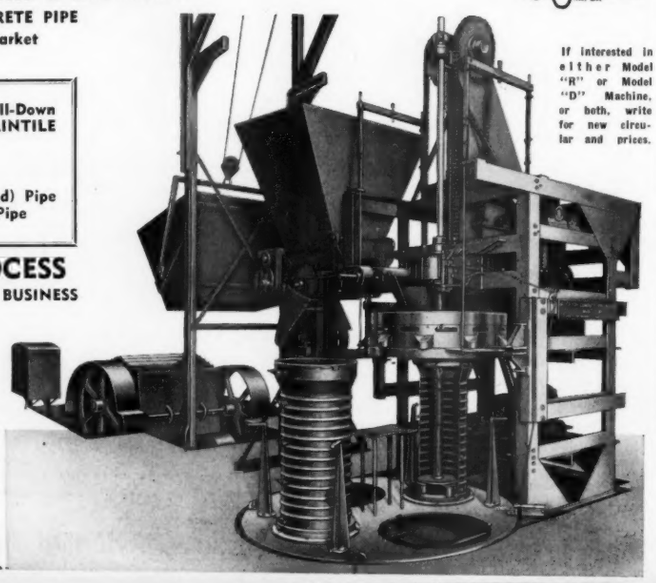

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Avoid Legal Pitfalls

(Continued from preceding page)

N. E. 1085). If no legal assessment should be made in time, he would have a valid claim against the City for the contract price.

Summary

Before leaving the Oregon case, we might summarize it as follows: Where a mistake produces a marked disparity between a low bid and the next highest bid—or the engineer's estimate—the public authority may be presumed to know that a mistake has been made. In such a case, courts will probably not allow the authority to take advantage of the mistake. This is especially likely where request for withdrawal precedes any official action on the bid. However, we must remember that a contractor can still be held bound by a bid made under a mistake.

Bond Does Not Cover Damage To Abutting-Property Owner

THE PROBLEM: *A street-underpass contractor's bond covered liability for injury to property committed in performing the contract and "caused by accident . . . arising solely and directly out of the work." Damages were sustained by an abutting-property owner when access to his premises was necessarily obstructed while the work was in progress. Did the contractor's bond cover him in this case, no negligence being claimed?*

THE ANSWER: No. (Lumbermen's Mutual Casualty Co. v. C. Y. Thomason Co., 87 Fed. Supp. 889, decided by the United States District Court, Western District, South Carolina.)

The court decided that the insurance company, surety for the contractor, was not obligated to defend a suit brought against the latter by the abutting-property owner. The court said that if the property owner had alleged negligent and accidental injury caused by the contractor, the surety would have been bound to defend.

Fair Labor Standards Act Covers Dredging and Deposit

THE PROBLEM: *As interpreted by the courts, employees engaged in constructing a facility to be used in interstate commerce are not governed by the Federal Fair Labor Standards Act. But widening and deepening of navigation channels constitutes such repair, maintenance, and improvement as come under the Act. Certain employees were engaged in the latter class of work in San Juan Bay, Puerto Rico. Were they excluded from operation of the Act because the dredged material was used as fill in constructing a new dry dock and Army terminal and air-base facilities?*

THE ANSWER: No. (Cuascut v. Standard Dredging Corp., 94 Fed. Supp. 197, decided by the United States District Court, Puerto Rico.)

The court said that the employees were "engaged wholly in submarine excavation . . . and as a necessary incident to an integrated dredging operation, the deposit of the dredged material in an appropriate place away from the dredged area."

Owner Liable for Price After Sale of Property

THE PROBLEM: *A ranch owner sold his property after contracting for extension of a drain. Work was commenced without the contractor knowing that the ranch had been sold to a third person. The contracting owner made no attempt to be relieved from the contract. Did he remain liable to the contractor for the contract price?*

THE ANSWER: Yes. (Cook v. Johnson, 221 Pac. 2d 525, decided by the Washington Supreme Court.)

The court rejected a contention that the contractor was obligated to contact the owner with whom he had contracted on discovering that the land had been sold.

Time for Suing Expires

THE PROBLEM: *A statute required that suit by a government contractor against a subcontractor, for breach by the latter, be brought within three years. A subcontractor broke his contract by failing to pay labor and material claims, thereby imposing obligation on the contractor to pay them and look to the subcontractor for reimbursement. The contractor brought suit within three years after he paid the claims, but more than three years had elapsed since he had become obligated to pay them. Was he entitled to bring suit, within the meaning of the statute?*

THE ANSWER: No. (H. Herfurth, Jr., Inc. v. Acker, 177 Fed. 2d 38, decided by the United States Court of Appeals, District of Columbia.)

(Concluded on next page)

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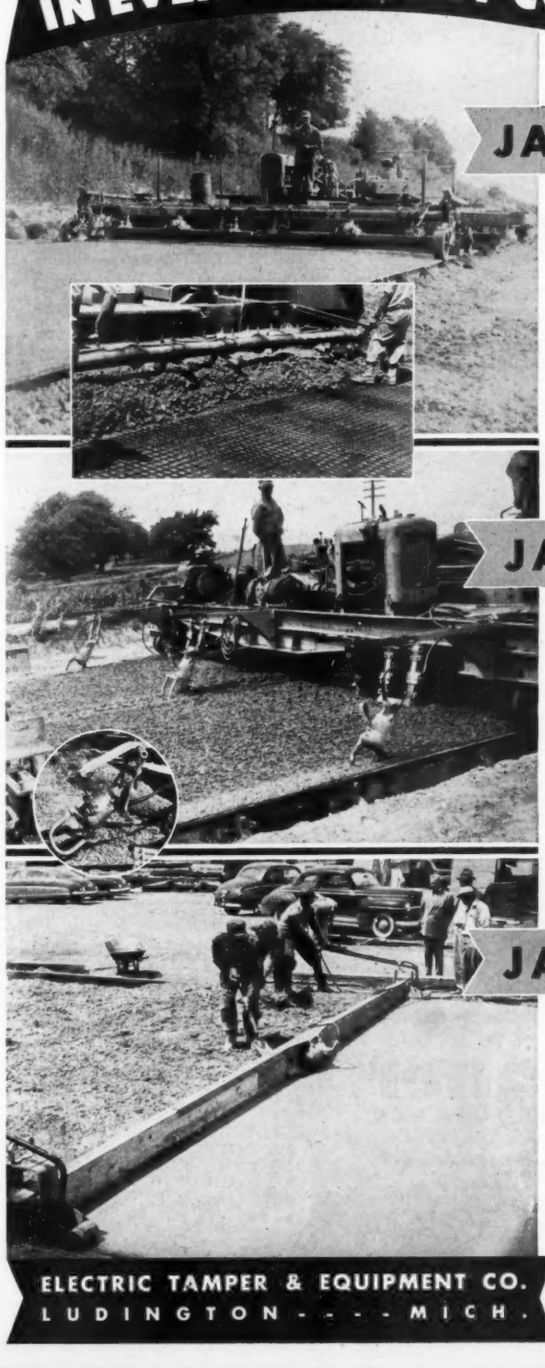

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Avoid Legal Pitfalls

(Continued from preceding page)

In short, the 3-year period within which the contractor could sue ran from the time when the sub's breach of contract obligated him to pay claims—and not from the time when he discharged that obligation by paying the claims.

Chattel Mortgage Is Filed Incorrectly; Held Not Fatal

THE PROBLEM: *An equipment company sold a road grader on credit terms, but did not take a mortgage on it until after the buyer had mortgaged it to a bank. The company's representative, before taking its mortgage, correctly describing the property as "1 Adams Motor Grader, Model 305, Serial 416", knew that the bank's mortgage described "1 Adams Motor Grader, Model 315 . . . Serial 819"; that there was no Model 315; and that the bank's mortgage was intended to cover the one and only grader that the buyer possessed. Did the bank's mortgage come ahead of the equipment company's?*

THE ANSWER: Yes. (Exchange Bank of Kahoka v. Bash, 234 S. W. 2d 341, decided by the St. Louis Court of Appeals.)

There have been decisions to the effect that factory serial and model numbers, in chattel mortgages filed or recorded in a public office as notice to the world of the mortgagee's rights, must be correctly given in order that the filing or recording be effective. The court said that these decisions do not apply to road-making machinery, in the absence of any statute requiring model and serial numbers on such equipment to be registered with particularity.

The court followed the general rule that a chattel-mortgage filing is sufficient if the description is such as will enable one examining the record to identify the property.

Rights of Surety Against Assignee of Job Proceeds

THE PROBLEM: *The surety on a state road contractor's bond to pay labor and material bills did not know that the contractor had already assigned to a bank money to become due the latter from the State. (1) Did the surety have a valid claim against proceeds remaining in the hands of the State to reimburse itself on account of labor and material bills paid by it, which the contractor failed to pay? (2) If so, was the surety's claim superior to that of the bank, where the bank failed to show that advances made by it to the contractor were used by him in performing the road contract?*

THE ANSWER: Yes. (Seaboard Surety Co. v. State of North Dakota, 94 Fed. Supp. 177, decided by the United States District Court for North Dakota.)

The court said that although the bank received an assignment of the contract before it was actually awarded to the contractor, no lien attached in favor of the bank until after the contract was awarded. And when the contract came into existence, the bank was bound to know that equitable rights had accrued in favor of the surety, because there could be no binding contract, to which an assignment could apply, until the bond was given.

And because it was not proved that the bank's advances were used wholly in performing the contract, the bank's rights were not equal to those of the surety.

Road-Contractor Duties As to Railroad Traffic

THE PROBLEM: *A railroad employee was killed in a collision between a locomotive and a road contractor's dirt-mover at a crossing of a highway under construction. Could the widow hold the contractor liable on a theory that contract clauses requiring him to maintain signs, flares, etc., to protect traffic, applied to traffic on the railroad as well as on the highway?*

THE ANSWER: No. (Foshee v. Daoust, 185 Fed. 2d 23, decided by the United States Court of Appeals, Seventh Circuit.)

The court said that even if the contract had required the contractor to maintain a watchman at the crossing, which it did not, the requirement would have been for the benefit of highway traffic alone, because the context of the contract showed that only the latter class of traffic was intended to be covered by the clauses in question.

Project Engineer's Widow Wins a Compensation Award

THE PROBLEM: *In passing through a town to inspect a highway under construction, a project engineer detoured in the town to visit an ailing parent. Resuming his trip, he was killed in his automobile in a collision. Did the fact that he had combined the visit with his work deprive his widow of right to an award against the State Highway Department, his employer?*

THE ANSWER: No. (Parr v. New Mexico State Highway Department, 215 Pac. 2d 602, decided by the New Mexico Supreme Court.)

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Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 914.

Hardening Compound To Increase Tool Life

A new steel-hardening compound, claimed to increase the life of tools up to 300 per cent, is marketed by Morsdon Sales Co., 511 Fifth Ave., New York 17, N. Y. The hardening process is performed in a few minutes and no special equipment is required; the company points out that a small shop or maintenance department may use the compound as effectively as a large factory or mill.

Hard-N-Tuff is manufactured in powder form and contains chemicals that fuse deeply into steel, giving it the properties of much higher grades, the manufacturer says. Less costly steel such as boiler plate, hardened with Hard-N-Tuff and used for dies, drills, punches, cams, fixtures, and impact parts, is said to outperform and outlast more expensive steels generally used for the same operations. The compound is recommended by the company wherever parts are subjected to cutting, wearing, abrasive, or corrosive action. It is said to contain no cyanide or other toxic ingredients.

The piece or part to be hardened is dipped or rolled in Hard-N-Tuff, using a gas or acetylene torch—or for larger pieces, an open furnace or forge—to get even distribution of heat. Reheating and quick quenching will bring the steel to a high Rockwell hardness, Morsdon claims. The compound is packed in 3, 5, and 10-pound cans, and in 25, 50, and 100-pound drums.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 921.

Flexible-Coupling Data

A new 4-page illustrated folder on Style RC (roller chain) flexible shaft couplings has been prepared by Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill. Engineering information includes dimensions, weights, service factors, and horsepower ratings. Detailed data are also given on two types of protective grease-retaining casings—Style R, a spun metal revolving type, and Style P, a plastic revolving type.

This literature may be obtained from the company by requesting Folder No. 2363, or by using the Request Card at page 16. Circle No. 874.

Two Heavy-Duty Drills

Two new heavy-duty drills, Models 427 and 230, have been announced by Cummins Portable Tools, Division of Cummins Chicago Corp., 4740 N. Ravenswood Ave., Chicago 40, Ill. Specifications for Model 427 include a capacity of ¼ inch in metal and ¾ inch in hard wood; no-load speed of 1,750 rpm; a Jacobs Model 7B geared chuck; an overall length of 12¼ inches; and a weight of 6 pounds.

Slightly heavier, Model 230 has a capacity of ⅜ inch in metal and 1 inch in hard wood. Other specifications include a no-load speed of 1,750 rpm; a Model 32B Jacobs geared chuck; and 13½-inch overall length.

Both drills have universal motors for ac or dc operation on 60-cycle 115-volt current (220-volt special); antifriction bearings throughout; double-reduction helical cut gears; die-cast aluminum frame; and 10-foot 3-conductor cord with rubber plug and pigtail for ground.

The Cummins Model 427 drill has a capacity of ¼ inch in metal and ¾ in hard wood. It weighs 6 pounds.

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A sludge-free lubricant, Wingslide, designed for motor-grader blade-turning mechanisms is marketed by Norgahn Co., Wausau, Wis. The company also recommends it as a lubricant for all outside lubricating needs. The compound adheres to metal and will not mix with water, Norgahn states. It is also adaptable to truck-plow chafing plates to help eliminate friction. Ready for immediate delivery, this sludge-free lubricant is available in 18 and 45-pound containers.

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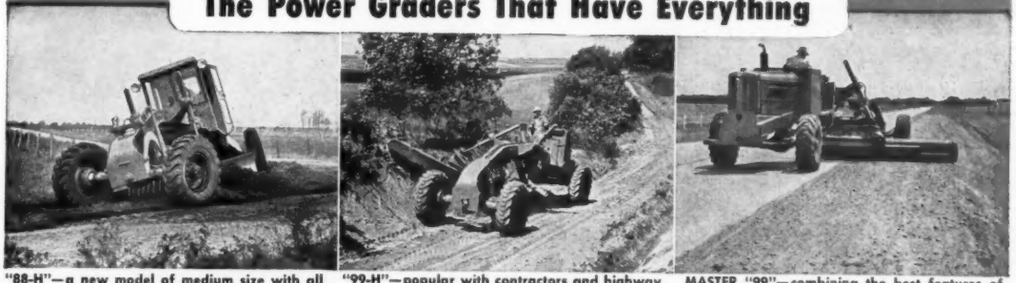

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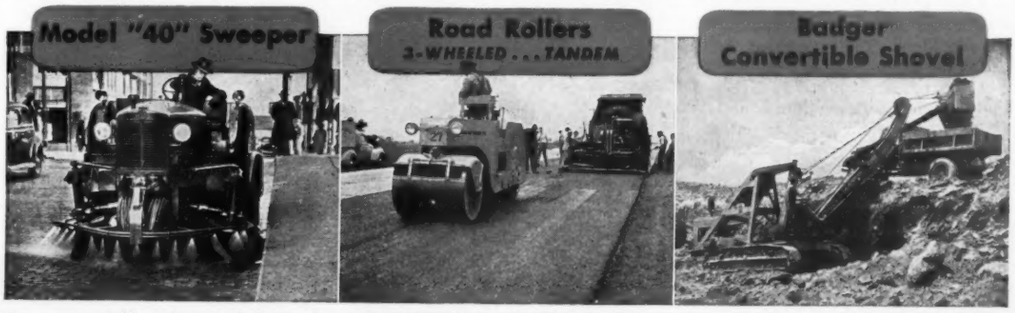


Fast, maneuverable and economical. Dirt is thrown directly into the 2-yard hopper. Right-hand or left-hand gutter broom, or both.

3-WHEELED ROLLERS with hydraulic scarifiers. TANDEM ROLLERS of the variable weight type. All with gas or diesel engines.

The ¾-swing Badger wastes no power swinging extra weight; makes more swings per hour; can work in closer quarters.

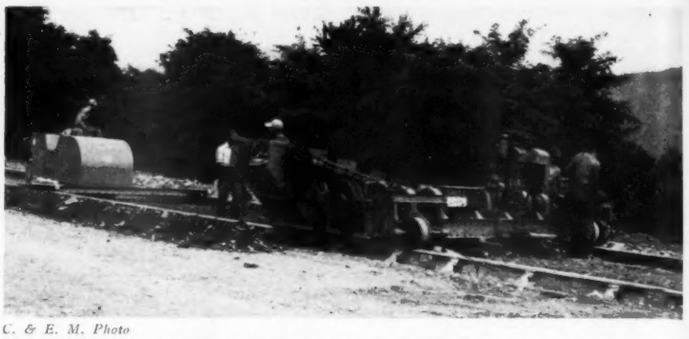
Advanced engineering and honest construction characterizes each Austin-Western product. Your nearby A-W distributor will gladly recommend the one best suited to your needs.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.

BUILDERS OF ROAD MACHINERY
Austin Western
SINCE 1859

Three-Lane Concrete Laid on Gravel Base

Seven-Mile Paving Job Is Part of Reconstruction on U. S. 11 And 15 in Central Pennsylvania



C. & E. M. Photo

A Buckeye Power Finegrader, Model FG 13, works inside the forms on the U. S. 11 reconstruction project near Liverpool, Pa.

• THE Pennsylvania Department of Highways is reconstructing a considerable stretch of U. S. 11 and 15 north of Harrisburg, along the west bank of the Susquehanna River. One of the longest sections under way or already completed is a 7-mile project, L.R. 195 (6C), 229 (24), between Liverpool and McKees Half Falls located in Perry, Juniata, and Snyder counties. This was finished last season under a joint-venture $1,643,883.21 contract awarded to James Julian of Wilmington, Del., and R. E. and Ruth S. Dutcher of Queenstown, Md.

Work on the 3-lane 33-foot reinforced-concrete highway began in September, 1949, and was finished in November, 1950. The original pavement, also of concrete, was only 16 feet wide, except short sections that were 18 feet, and the narrow road had many sharp curves, poor sight distances, and a surface that was rough and broken. Such undesirable features were eliminated with a new location alignment that lies east of the old road close to the picturesque Susquehanna, and partly over a long unused canal that was filled in with borrow.

Grading Operations

Earthwork totaled 78,699 cubic yards of excavation and 679,980 cubic yards of borrow. The heavy borrow item helped fill in the old canal, which was 30 feet wide and from 10 to 12 feet deep. The bulk of the grading was done with a Koehring 2½-yard shovel working with a fleet of 15 trucks, and 10 Super C Tournapulls on the long hauls from the borrow pits. Dozing and leveling of the fills was handled by 8 Caterpillar D8 tractors. Included in this initial operation was the construction of 13 major drainage structures: 10 RC structures; 2 extensions of existing structures; and one I-beam bridge with an overall length of 297 feet.

Grading was halted that 1949-50 winter for 2½ months because of inclement weather, but picked up again last spring. It was completed in time for paving to start the middle of June. The finished roadway section contains three 11-foot lanes of 9-inch uniform reinforced-concrete pavement, flanked by 10-foot shoulders. The pavement is crowned at the center, having a ¾-inch straight slope from the center line to the longitudinal joint between lanes, and a 1¾-inch straight slope over the outside lane to the edge of pavement. Shoulders pitch at the rate of 1½ inches to the foot in cut section, and ¾ inches to the foot in fill section.

Underneath the concrete pavement, and extending out through the shoulder on each side on a typical section, is a 6-inch insulation or base course of pervious material composed of sand and gravel, graded uniformly from coarse to fine, not exceeding a maximum of 4 inches in size. All this material was obtained locally from pits not far from the highway.

Batch Plant

The contractor set up a batch plant alongside the new roadway, about a mile south of the upper end. Sand and stone for the concrete aggregate were delivered to the plant by truck. Sand came from the Lycoming Silica Sand Co. of Montoursville, Pa., and the stone from the J. C. Stahl Estate, National Limestone Quarry, Middleburg, Pa. The hauls averaged 52 and 24 miles respectively. Bulk air-entrained cement was supplied by the Lehigh Portland Cement Co., being shipped by rail from the plant at Ormrod, Pa., to a siding of the Pennsylvania Railroad at Middleburg. From the siding a fleet of ten covered trucks, holding 10 tons each, hauled the cement to the plant.

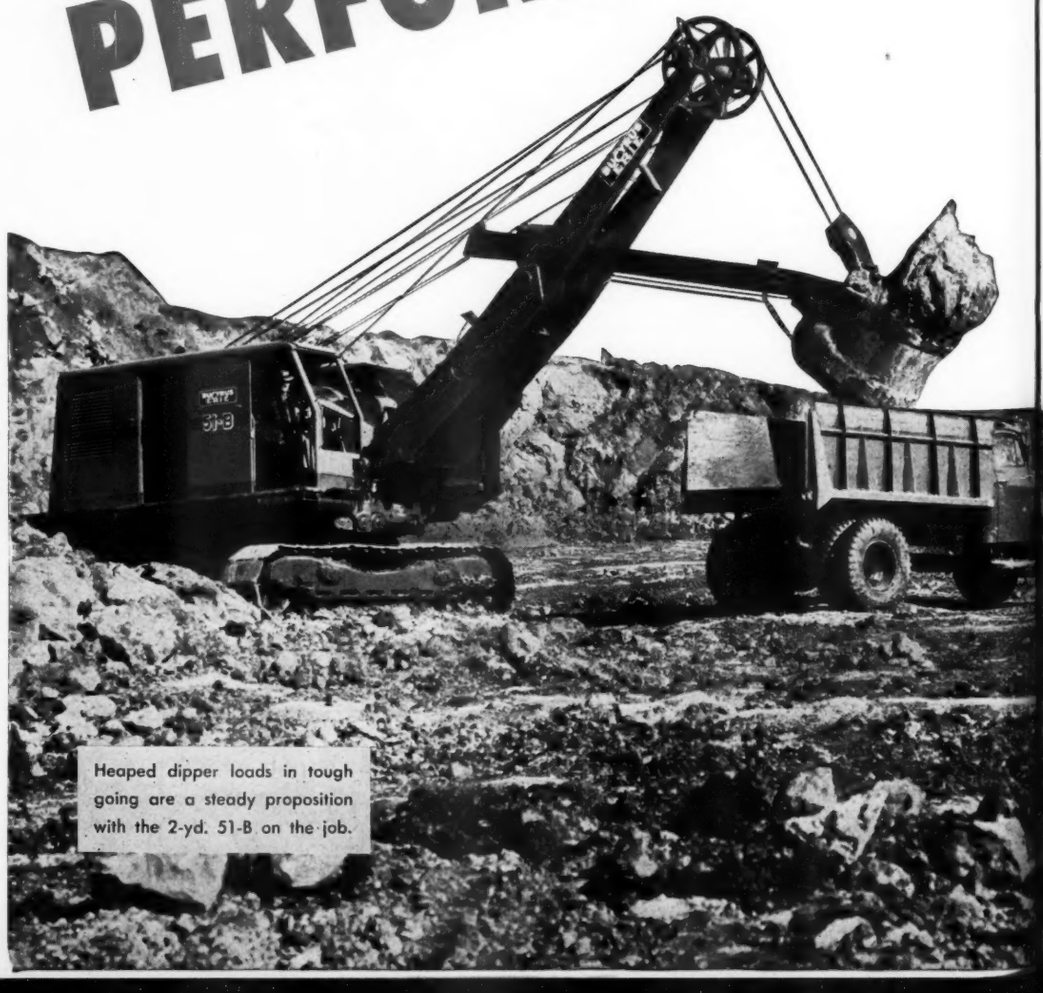
From the aggregate stockpiles, a Koehring 703 crane equipped with a 56-foot boom and an Owen 2-yard clamshell bucket loaded a Heltzel 105-ton 3-compartment storage bin. Another Koehring crane, a 304 with a 45-foot boom and a Johnson 1-yard clamshell bucket, was held in reserve or used in building up the stockpiles. Cement was stored in a Heltzel 500-barrel cement bin. A fleet of 20 hired trucks, holding two batches each, hauled the materials from plant to paver. The cement was carried in separate metal containers. The plant was laid out so that the trucks ran under the bins in picking up a load, thus losing no time in backing up.

Two sizes of stone served as coarse aggregate—No. 3A graded from 2½-inch down, and No. 2B graded from

(Continued on next page)

---Mark

PROVEN PERFORMANCE



Heaped dipper loads in tough going are a steady proposition with the 2-yd. 51-B on the job.

1¼-inch down. The mix was 1 : 2 : 3.5, with 8½-bag batches that yielded 1.36 cubic yards of concrete, and weighed 5,406 pounds. The batched weights of a typical batch were as follows:

Cement	799 lbs.
Sand	1,537 lbs.
3A stone	1,404 lbs.
2B stone	1,420 lbs.
Water — 30 gallons (Exclusive of surface moisture)	246 lbs.
Total	5,406 lbs.

Total water in the batch approximated 4.97 gallons per bag or 42.2 gallons plus or minus.

Paving 11-Foot Lanes

The 33-foot pavement was laid down in 11-foot lanes. The contractor brought to the job 5,000 linear feet of Heltzel forms, and ran into difficulty driving the form pins into the tightly compacted sand-gravel base course. Hand driving was out of the question. An Adams motor grader removed the excess material in the upper portion of the base, and the pins were driven with a Cleveland air hammer powered by a Joy-Sullivan Zephair compressor mounted on a truck.

C. & E. M. Photo

Aggregate for the Julian-Dutcher $1,643,883 concrete-paving contract is loaded into a Heltzel bin by a Koehring 703 crane.

After the grader had finished its reshaping, any excess material was removed by a Buckeye Power Finegrader, Model FG 13, working inside the forms. The grade was then checked with a scratch template, and passed over again by a Huber 3½-ton tandem roller to compact loose material and ruts less than 3 inches deep. This was followed with another pass from the scratch template to make sure that the full 9-inch cross section had been held.

Contraction joints, with Behringer load-transfer assemblies, were then set on 61-foot 6-inch centers. These joints consist of a transverse 14-gage plate 9 inches deep, with 1 x 18-inch dowels on 12-inch centers. Every tenth joint, or 615 feet apart, is an expansion joint consisting of a felt-impregnated strip that was topped with a metal channel during the paving operations. The lips on the channel are 2 inches long.

The 11-foot adjoining lanes were tied together by means of a metal keyway bolted to the forms, and with ½-inch x 4-foot 3-inch bars—half their length in the slabs of one lane, and half in the other. From the joints the longitudinal tie bars were spaced 1 foot, 2 feet and 3 inches, then 5 feet for the rest of the way. These bars came in two sections, so that after one lane was paved the other half length was screwed in from the adjoining side about to be paved. For ease in handling the steel dowels and assemblies, a special bridge or carriage was made to carry them as it was pushed along on the form rails.

Paving and Finishing Equipment

Batches were mixed 1½ minutes in a Ransome 34-E dual-drum, permitting a discharge approximately every 50 seconds. The paver was equipped with a 45-foot boom. Water for the mix was pumped from a creek along the road into two 1,000-gallon tank trucks, a Mack and a Brockway. They in turn served the paver, the water being drawn through a hose by a pump on the paver. The tank trucks also supplied the water for wetting down the grade before the concrete was deposited between the oiled forms.

The mixed batches were discharged in front of a Blaw-Knox paddle-type spreader that struck off the concrete to a level 2 inches below the top of the form. Bethlehem bar-mat reinforcing steel was then set in place, and covered with more concrete to fill the forms. At the rear of the spreader two vibrators were carried to vibrate the concrete at the joints; hand spading was done along the forms. Behind the spreader the mechanized finishing equipment consisted of a pair of Blaw-Knox dual-screed finishers and a Koehring Longitudinal Finisher. The rest of the finishing was done by hand.

First the surface was checked with a 10-foot straightedge, and then hand-floated. A strip of burlap, wider than the 11-foot lane and 3 feet in length,

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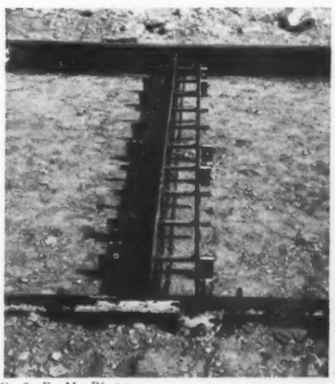


C. & E. M. Photo

A Behringer load-transfer assembly is set between the Heltzel forms in an 11-foot lane.

# of a Preferred Excavator

THE four most important measures of excavator performance are a smooth fast work cycle, ability to stand up under punishment, quick front end convertibility, and ease of maintenance. Bucyrus-Erie fills the bill on all four.

Bucyrus-Erie's outstanding design balance ties in the dig-swing-dump operations smoothly and efficiently. Highly responsive controls, smooth clutch action and positive, independent crowd help operators get bigger loads every pass . . . more passes every hour than ever before.

There are seven different Bucyrus-Erie models in the ⅜- to 4-yd. range of gasoline, diesel, and single-motor electric machines — each with size and strength throughout to match its rated capacity. Each can be quickly converted in the field to the front end that produces the best job efficiency. And simple, clean design makes parts readily accessible, maintenance easy.

Best proof that these features bring top performance is out in the field. For instance, yardage-wise owners have bought more 10-B's than any other ⅜-yd. excavator . . . more Bucyrus-Eries for rock than any other make. The *record* shows that with owners, operators and maintenance men alike, Bucyrus-Erie is the one line that's

259ES1C

Most Compared

Most Preferred

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

Three-Lane Concrete Laid on Gravel Base

(*Continued from preceding page*)

was then pulled twice over the surface, while finishers removed the metal caps from the expansion joints. A strip of wood was inserted in place of the cap, and left there until the concrete began to set up sufficiently to edge the transverse joint. This strip was later removed and the joint poured with asphalt. Joints were edged, and the concrete was covered with Sisalkraft paper for curing. The paper was covered with a sprinkling of dirt along each edge to keep it from blowing away and to keep it air-tight. It was left on for 72 hours. Forms were removed after 24 hours of curing, and the sides of the concrete pavement were covered with a marginal strip of Sisalkraft paper 18 inches wide, and banked with earth.

Good Average

The highway was paved a lane at a time, with the paver working outside the forms for the first two lanes, and on top of the concrete for the third lane. One-inch-thick rubber mats protected the surface from the treads of the big machine while it was operating on top of the concrete pavement. During favorable weather the contractor maintained a steady pace of 3,000 linear feet of pavement in a 12-hour day. The maximum production was 3,538 feet of 11-foot width in 13 hours.

At the peak of construction a force of 200 men was employed on the project under the direction of James M. Jones, veteran superintendent for James Julian, the general contractor. The Pennsylvania Department of Highways was represented on the contract by J. I. Hepner, Inspector. The Department is headed by E. L. Schmidt, Chief Engineer, with W. A. Warrick, Chief Construction Engineer. This project is located in District 8, of which A. J. Bedard is District Engineer, with headquarters in Harrisburg.

C. & E. M. Photo

As the Ransome paver works on the Pennsylvania job, it receives water from a 1,000-gallon tank mounted on a Mack truck. The pump is on the paver.

Protective Compound For Welded Surfaces

Metal left unprotected from arc spatter or gas flame is often spoiled. In the case of important dies and cutting tools, and in fabricating equipment of polished metal, plated metal, etc., an unprotected area around a weld can cause total loss of usefulness. To avoid these casualties, a new compound to protect surfaces from being marked by flame, spatter, and arc has been developed by Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y. Canned in thin paste form, Eutecto-Mask can be spread with the welding flux over the area to be protected. The dried residue, it is claimed, is easily removed after the welding operation is completed.

Further information may be secured from the company by requesting Bulletin 312-P. Or use the Request Card at page 16. Circle No. 861.

Tractor-Mounted Loader

A 4-page circular describing the Ware loader mounted on the Oliver Model B tractor is available from Ware Machine Works, Inc., Ware, Mass. It outlines the 13 principal features of the loader, illustrates the unit in use, and provides complete specifications.

The Model B has a maximum loading height, with bucket dumped 45 degrees, of 8 feet 6 inches. It is available with a ¾-yard standard bucket, a 1-yard special bucket, or a 2-yard light-material bucket. All buckets are hydraulically controlled.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 890.

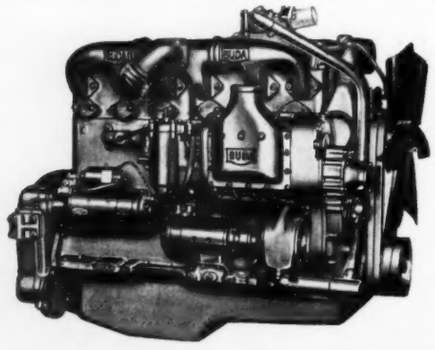
Get MORE POWER and LUGGING ABILITY into your earth-moving equipment and move dirt at lower cost per yard.

BUDA dyna-swirl DIESELS GIVE YOU:

- 15-20% more power at the crankshaft
- 10-15% more piston displacement
- 10-20% more lugging ability
- Dyna-Swirl Combustion—lower fuel cost per horsepower

PLUS up to 6000 or more hours operation before overhaul!

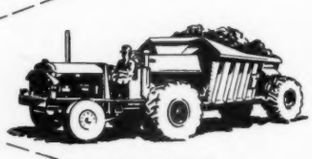
Get *all* the facts on Buda Diesels from your nearby Buda Distributor today. He can show you how Buda Diesels give you more horsepower hours per dollar. Write for Bulletins, data and Specifications. The Buda Company, Harvey, Illinois.



NEW BUDA *dyna-swirl* DIESELS FOR

SCRAPERS

DOZERS



WAGONS

BC-10

a *Power-Full and Dependable Name in Engines...*

BUDA

Ask the men who live with wire rope...

They insist on genuine

CROSBY CLIPS

Drop-forged
Hot dip galvanized
SIZES FOR ALL WIRE ROPE
DISTRIBUTORS EVERYWHERE

AMERICAN HOIST & DERRICK CO.
ST. PAUL 1, MINNESOTA

Convention Calendar

May 14-15—Florida Road Conference
Annual Florida Highway Conference, University of Florida, Gainesville, Fla. L. J. Ritter, Associate Professor of Civil Engineering, University of Florida, Gainesville, Fla.

June 13-16—ASCE Meeting
Summer Convention, American Society of Civil Engineers, Brown Hotel, Louisville, Ky. C. W. Lovell, General Chairman, 418 Oread Road, Louisville, Ky.

June 18-22—ASTM Meeting
Annual Meeting, American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, N.J. Robert J. Painter, Assistant Secretary, ASTM, 1916 Race St., Philadelphia, Pa.

October 8-14—Pan American Road Congress
Fifth Pan American Highway Congress, Lima, Peru. International Road Federation, 550 Washington Bldg., Washington 5, D.C.

ASTM Soils Committee Reports

During Committee Week of the American Society for Testing Materials, in Cincinnati, Committee D-18 approved three new methods of testing soils for engineering purposes. One method measures the bearing capacity of soil for static load on spread footings; the other two are repetitive and nonrepetitive static-load tests for the elevation and design of airport and highway pavements.

Technical papers presented at the main meeting covered the identification of clays by staining tests, the effects of particle interlocking on the strength of cohesionless soil, and the use of deaired extended soil specimens for research and evaluation of test procedures. A section of the committee was asked to work on the standardization of test methods for the California bearing ratio.

Late in 1950 the Committee published a 430-page book covering procedures for testing soils. The book includes all the methods standardized by the Committee, plus methods not yet standardized. There are procedures covering soil exploration and sampling; physical characteristics and identification; physical and structural properties; special and construction control tests for subgrades, base courses, etc.; and soil-bearing tests in place and dynamic properties. This book may be obtained from the ASTM, 1916 Race St., Philadelphia 3, Pa. It costs $3.75 with a heavy paper cover and $4.40 with a cloth binding.

Bulletin on Chain Saws

A pocket-sized leaflet describing two lightweight chain saws has been prepared by Lombard Governor Corp., Ashland, Mass. It describes the Model 4, a 19-inch one-man saw, and the Model 42, a 30-inch two-man saw. It illustrates the saws, points out all features, provides complete specifications, and pictures on-the-job applications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 935.

P&H Builds Diesel Plant

The Harnischfeger Corp. has begun construction on its eighth plant, a 100,000-square-foot factory and office building in Crystal Lake, Ill., which will house the company's Diesel Division. Production of diesel engines is slated to start there October 1. Between 300 and 400 workers will be employed eventually and the plant capacity will provide for a total production of 1,200 to 1,500 hp every working day, the equivalent of ten 6-cylinder engines a day.

Karl Schoeppner, who was appointed eight years ago to develop the diesel program for Harnischfeger, will manage the new plant.

Highway-Engineering Text

A new textbook on highway engineering stresses the significant changes that have taken place in highway practice since the end of World War II. It discusses subjects in the approximate sequence in which they must be considered when developing a highway system or improving an individual highway. Its authors are Leo J. Ritter and Radnor J. Paquette, both of the Department of Civil Engineering of the University of Florida.

The book is designed to meet the need for both introductory and advanced courses in highway engineering offered to junior and senior civil-engineering students. There are complete descriptions of the nature and function of modern construction equipment, as well as practical data on construction costs.

The book is priced at $6.50 and may be obtained from The Ronald Press Co., 15 E. 26th St., New York 10, N. Y.

Corrosion-Control Coatings

A new illustrated bulletin on Vinyl plastic coatings for the control of corrosion on exteriors of steel, concrete, brick, formed block, and plywood structures is available from Casey & Case Coating Co., P. O. Box 151, Maywood, Calif. These coatings are also designed for application where there are surface maintenance problems on exterior and interior tank linings.

The 12-page catalog gives the specific properties of the coatings, a chart of their chemical resistance, and data on applications. The products are designed to withstand severe weathering conditions and combat the corrosive action of acids, fuels, alkalis, salts, and other corrosive agents.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 989.

Helmer Leaves Okla. Dept.

Research Engineer R. A. Helmer, authority on soils related to highway construction, has resigned from the Oklahoma State Highway Department after more than 19 years of service. He is now Chief Engineer for the Standard Testing Laboratories of Oklahoma City.

13 PAY YARDS PER TRIP . . .
13 TRIPS PER HOUR . . .
6300 YARDS PER DAY

***That's* LPC MOTOR SCRAPER PRODUCTION**
on California dirt moving job!

ASK Ernie Wright, General Superintendent for Pacific Contracting Corp. of Long Beach, Calif. about Motor Scraper performance. Ernie says, "We have five TS-300's . . . four working while one is being serviced . . . leveling typical California sandy loam, loose and dry. With no definite haul roads, each Motor Scraper averages 13 trips per hour, 13 yards per trip, on one-way hauls ranging up to 1300 ft. High horsepower-to-yardage ratio gives the Motor Scraper the quick get-away ability that saves time on every cycle."

Power is just one of the many Motor Scraper features that assure superior earthmoving performance. Ask your LPC distributor to explain why Motor Scrapers are first choice on so many jobs. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa — LaPlant-Choate Sales and Service, 1022 77th Ave., Oakland, Calif.

BE SURE TO CHECK THE PROFIT POTENTIA OF THE TS-200 MOTOR SCRAPER

The powerful, agile, hydraulically controlled TS-200 is a 9- to 12-yd. earthmover, ideal for small yardage jobs, yet with all the capacity and speed necessary for big production on long haul jobs. Your nearest LaPlant-Choate distributor will be glad to give you details.

LAPLANT CHOATE

Cable-operated Scrapers in 6-, 8- and 14-yd. sizes for all makes of track-type tractors.

2- and 4-yd. Scrapers for track-type and rubber-tired industrial tractors.

Hydraulic and Cable-operated Dozers.

The Griffin high-intensity warning blinker has 360-degree visibility.

New Warning Blinker

A new high-intensity warning blinker with 360-degree visibility has been placed on the market by The Griffin Lamp Co., Hamilton, Ohio. Introduced as a specialty in its broad line of fleet-lighting equipment, Griffin's emergency roof-mounted blinker may be used for state and county highway vehicles as well as road-contracting equipment. The 360-degree airport lens (red, amber, or blue) is visible all around the horizon, in daylight or darkness. It features a special light pattern—a perpendicular shaft one inch wide, the high-intensity constant focal point increasing with distance.

The kit includes the complete assembly: a 50-candlepower double-contact bulb for low-loss ground, dual conductor cable, Tung Sol flasher, and mounting pad to seal the roof. The lamp is 6½ inches high overall, with a 4⅝-inch-high lens.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 946.

Concrete-Slab Cutter

Tri-Line concrete cutters can be used for more than one type of job and for cutting more than one type of material, says the new bulletin prepared by Tri-Line Co., 921 Carroll St., Racine, Wis. For example, it shows the cutter slicing concrete and blacktop highway and street surfaces, for normal maintenance and repairs, for installation of utilities, and for cutting contraction joints. It shows similar work on industrial-plant floor slabs and on airport runways.

The bulletin outlines the specifications and design features of the Tri-Line cutter. Chief of these are its one-man 3-wheel steerable design and its tricycle carriage to assure proper balance for eliminating binding of the cutting wheel. The bulletin also highlights the direct-acting hydraulic controls which permit cuts from a fraction of an inch to 6½ inches (with the larger-size blade). Users, the bulletin points out, include private contractors, state and county highway departments, city public-works departments, and public utility companies.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 987.

Thor Transfers, Promotions

Branch managerships of the Independent Pneumatic Tool Co., Aurora, Ill., have recently been reshuffled. John B. Dempsey has moved from the Pittsburgh to the Detroit branch, succeeding Robert G. Faverty who is now Managing Director of Armstrong-Whitworth & Co., Pneumatic Tools, Ltd., Thor subsidiary in England. Dempsey is succeeded at Pittsburgh by Edward W. Krantz. William J. McGraw in turn succeeds Krantz at the New York branch. And Clarence B. Bergren, Service Engineer in the St. Louis territory since 1946, succeeds McGraw as the branch manager at Cleveland.

Self-Sticking Signs With Safety Titles

A new line of self-adhesive safety signs has been introduced by W. H. Brady Co., Dept. 539, 16 E. Spring St., Chippewa Falls, Wis. The Quik-Label signs are printed on extra-strength cotton cloth which has a self-adhesive backing. The message is shown in bold letters on the proper safety background color. The signs may be used indoors or outdoors; they are coated with silicone plastic to protect them from dirt, moisture, and weather.

The signs are mounted on handy dispenser cards from which they can be removed quickly and applied. They stick, without moistening, to any clean surface. Over 550 different Quik-Labels are carried in stock. Special signs are also available with any wording and in any colors desired. The Brady safety signs conform to ASA Standards for Industrial Accident Prevention Signs developed by the ASA and the National Safety Council.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 957.

Robinson Clay News

Carl F. Schoenbaum is now Chief Engineer for The Robinson Clay Product Co. of Akron, Ohio. For the past three years Chief Engineer for the B. T. Bonnot Co. of Canton, Ohio, Mr. Schoenbaum has also been associated with The Heil Co., Ampco Corp., Harnischfeger Corp., and The Smith Engineering Co.

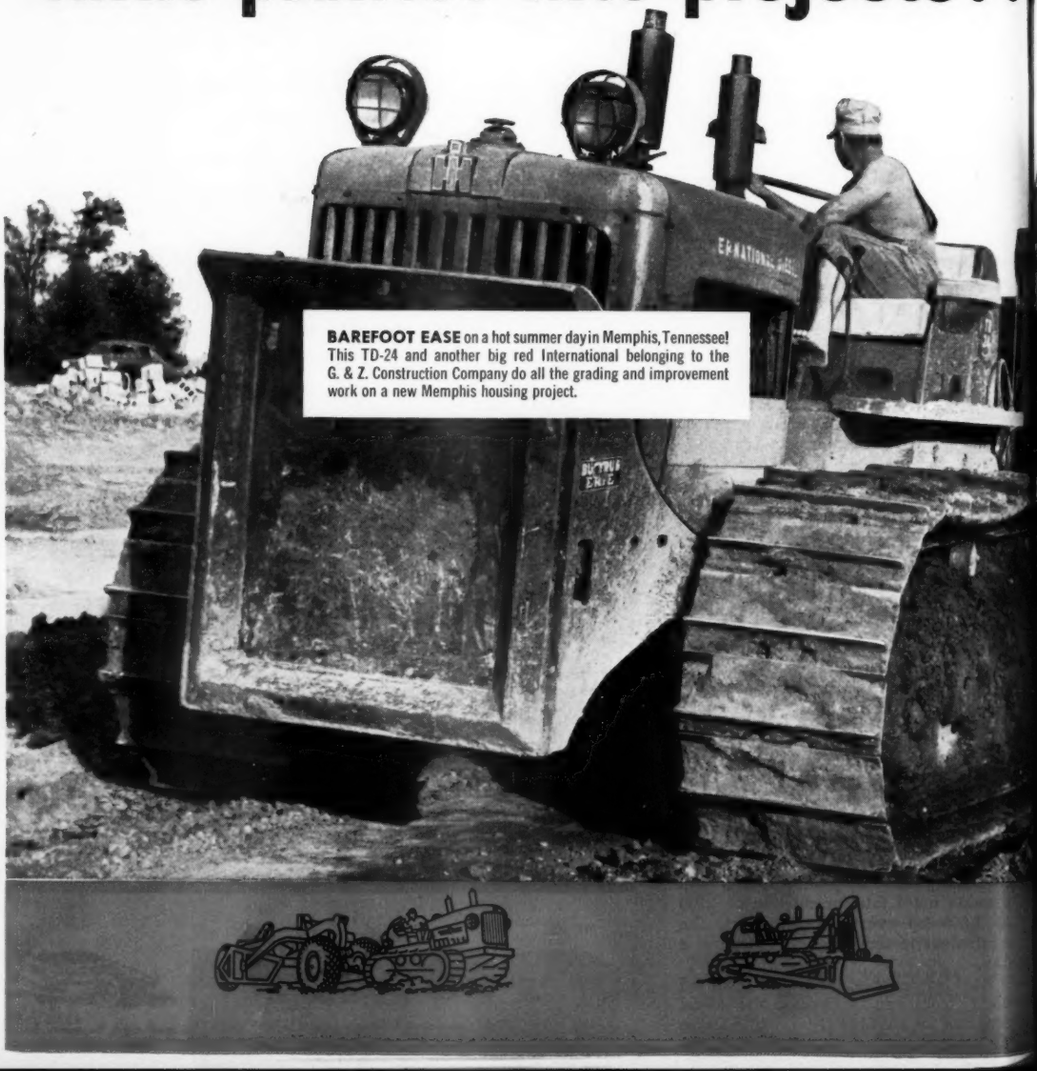
Lumber-Salvage Tool

A new wrecking tool, the Ripper Jack, is described in a 4-page folder issued by Calumet Steel Castings Corp., 1636 Summer St., Hammond, Ind. The 4-way tool is a combination crowbar, pry rod, nail puller, and sledge that can be used in almost any position. The bulletin illustrates applications and points out that many dollars can be saved by careful dismantling of forms, scaffolds, old buildings, etc., with the Ripper Jack.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 955.

"Big Red"

turns prairies into projects..



BAREFOOT EASE on a hot summer day in Memphis, Tennessee! This TD-24 and another big red International belonging to the G. & Z. Construction Company do all the grading and improvement work on a new Memphis housing project.

New Tri-Leg Support Makes Platform Base

New 3-legged supports, designed with adjustable knee-action in the head piece, can be set up in pairs with a rail or bar between, to make a horse that will stand evenly on rough and irregular surfaces. Each foot rests independently on the surface, adjusting to any slope or irregularity up to 2 inches in any direction. Manufactured by H. C. Sweet Co., 12083 Woodbine Ave., Detroit 28, Mich., the supports are available in heights from 18 inches to 5 feet. Four will form legs for temporary benches and tables.

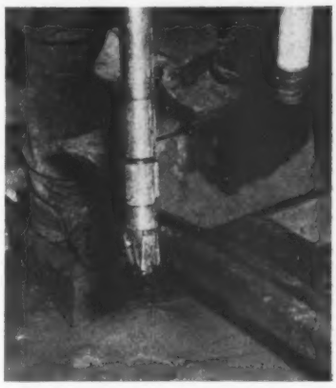
Strongly built of steel angles with riveted construction, the supports fold compactly to save transportation and storage space. They are practical for maintenance work indoors and out because of their adjustability to uneven flooring as well as to rough ground surfaces. With Sweet supports, one man can set up scaffolding in any length or width, the manufacturer says. The supports, when set up as horses, may be used for platforms of various widths and lengths.

Sweet Co. 3-legged supports can be set up in pairs with a rail or bar between to make a horse that will set evenly on rough and irregular surfaces.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 954.

Hawthorne Sales Mgr. Dies

Herman S. Simmons, Sales Manager for Herb J. Hawthorne, Inc., Houston, Texas, died recently in Shreveport, La. He joined Hawthorne in 1948 and worked for the company in all parts of the United States, Canada, and Mexico.



Blue Demon Rock Cutter bits feature hard-facing on tips, reaming edges, and cutting surfaces.

Replaceable Drill Bits

Hawthorne replaceable bits, used for many years in seismographic exploration work, are now finding increasing use in water-well, soil-test, and grout-hole drilling, according to a recent announcement by Herb J. Hawthorne, Inc., P. O. Box 7366, Houston 8, Texas.

The company's new catalog, No. 502, contains important facts about Hawthorne bits and detailed descriptions of the various assemblies offered. Explaining that the Hawthorne bits consist of an assembly and three replaceable blades, it outlines the resulting economies for the users.

The Blue Demon Rock Cutter blades manufactured by the company are designed for drilling in all types of formations. They may be used for shot-hole, core, slim-hole, and water-well drilling, the catalog says. Special feature is the addition of hard-facing on the tips, reaming edges and cutting surfaces of the blades. Sizes up to 8 inches may be obtained from stock supplies.

A copy of the catalog may be obtained from the company or by using the Request Card at page 16. Circle No. 882.

Conveyor and Elevator Belts

A 16-page bulletin covering all types of conveyor and elevator belting is available from Thermoid Co., 400 Whitehead Road, Trenton, N. J. It discusses each type of belting and suggests applications. Its tables, charts, and formulas are helpful.

The general information section, which describes the construction and functions of belt parts, is followed by illustrations and descriptions of the company's products. Fabric weight, tensile strength, friction pull, and maximum operating temperatures are given for each. Many useful tables are provided for determining maximum belt speeds, capacities delivered, drive factors for various conveyor systems, and other important data.

This literature may be obtained from the company by requesting form No. 3679, or by using the Request Card at page 16. Circle No. 899.

Miller Shifts Personnel

Miller Electric Mfg. Co., Appleton, Wis., manufacturer of arc-welding equipment, has made several changes in its sales organization. R. A. Metcalf is now Assistant Sales Manager and W. H. Siefferman has replaced him as District Manager of the Wisconsin, Minnesota, and North and South Dakota territory. F. H. Beck, District Manager in Ohio, eastern Indiana, Kentucky, and Pennsylvania for seven years, has taken over Michigan, and J. E. Vosburgh, formerly Sales Manager for the Glenn-Roberts Co., is Western District Manager in charge of Colorado, Wyoming, Montana, Utah, Nevada, New Mexico, Arizona, California, Oregon, Washington, and Idaho.

TD 24

Contractors tighten up the time cycles with International's "Big Red" champ

When the champ "goes domestic" and the world's most powerful crawler turns to housing projects, towns take shape while you watch.

When the TD-24 lets loose its power and speed to grade a road, fill a swamp, or doze off home sites on hillsides—the work gets done almost before you can say "Where's the concrete?"

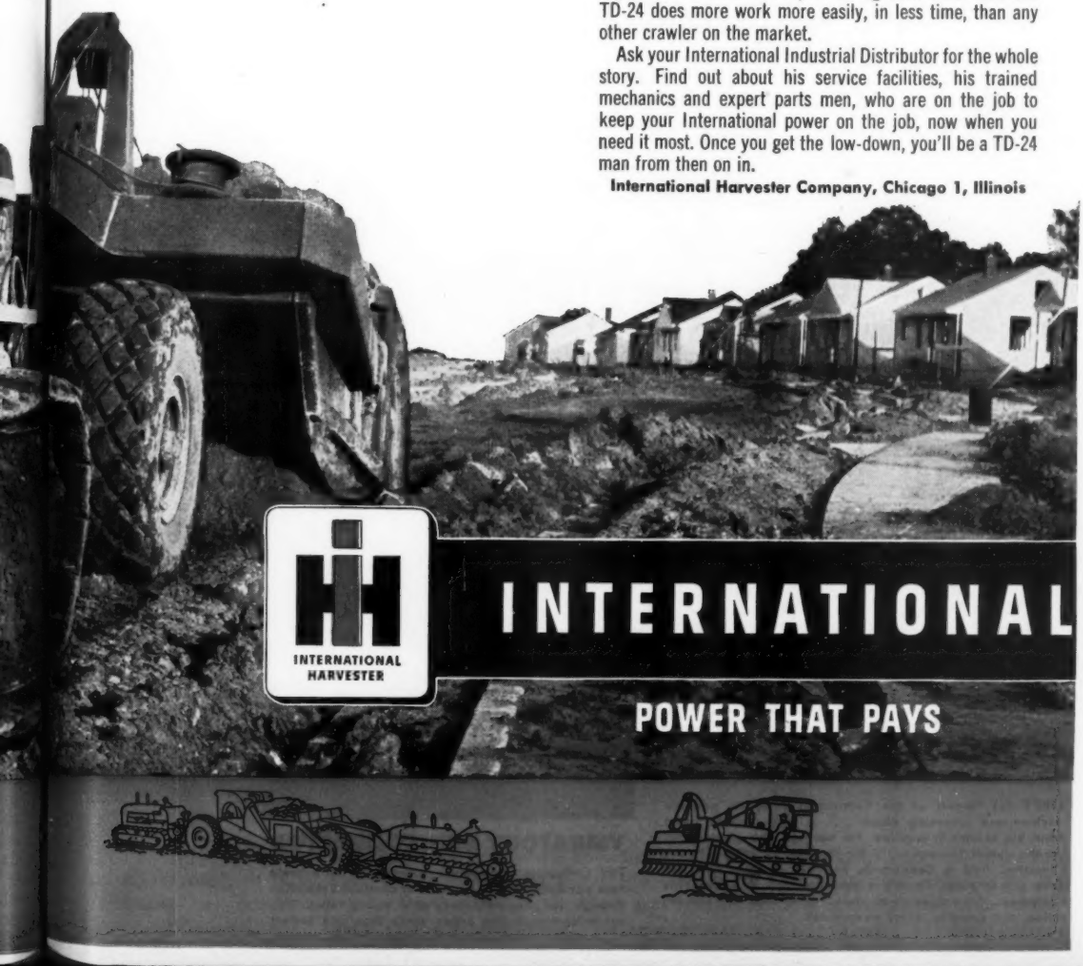
Here's what's behind it—here are the facts that make the big red International TD-24 the champ of the time cycle:

- 148 maximum drawbar horsepower—more than any other crawler.
- Eight forward speeds, eight reverse.
- Speeds up to 7.8 mph in either direction.
- Synchromesh transmission—you shift "on-the-go."
- Exclusive International push-button, all-weather starting.
- Planet Power steering—with finger-tip control for pivot turns, feathered turns, turns with power on both tracks plus instant shift up or down one gear without declutching.
- Reserve torque overcomes overloads, increases drawbar pull for bigger scraper and bulldozer loads.

Contractors, operators, men who know performance are passing the word around. They're telling each other how the TD-24 does more work more easily, in less time, than any other crawler on the market.

Ask your International Industrial Distributor for the whole story. Find out about his service facilities, his trained mechanics and expert parts men, who are on the job to keep your International power on the job, now when you need it most. Once you get the low-down, you'll be a TD-24 man from then on in.

International Harvester Company, Chicago 1, Illinois



Radio Helps Direct Highway Maintenance

Saves Time, Manpower, and Paper Work; Creates Public Good Will; Its Costs, Uses, and FCC Regulations

• MORE and more highway departments are using radiotelephone to help them direct road maintenance operations and provide better and safer highway service. The Federal Communications Commission now lists 62 state, county, and city highway departments which have received or requested permits to use radio frequencies. Six others are making field surveys, preparing specifications, or have inquired about available frequencies for estimating or budget-approval purposes. Detailed data from 40 of these highway departments disclose a combined radiotelephone coverage of 709,784 square miles and 129,075 highway miles.

This information was presented in Miami, Fla., last December, at the Annual Meeting of the American Association of State Highway Officials, by H. A. Radzikowski, Secretary of the AASHO Committee on the Use of Radio in Highway Departments.

Highway departments report to the Committee that radio reduces paper work, the number of men needed for an operation, and time lost when equipment breaks down. With radio, state and county engineers can supervise projects directly. Radiotelephone is useful in inventory control of equipment parts. It increases public good will by speeding up service to highway users and keeping them informed of road conditions. And it is of great help in floods, avalanches, wind storms, and other emergencies. While radio was originally associated with snow removal, more liberal FCC rules have made it important in year-round coordination of highway work.

What Does It Cost?

The cost of a radio system varies, says Mr. Radzikowski, with the density of population and traffic, and with the number of mobile radio installations necessary for proper traffic and highway service.

The California Department of Highways reports the cost of its radio system to date, including installation in six of eleven districts, as $450,000. It has 253 mobile, 43 base, 14 repeater, and 16 control stations. Final plans call for 100 main stations and 350 mobile units. This system is to be owned and operated exclusively by the Highway Department.

The Arizona Department of Highways estimates its radio system will cost $300.000. Of this amount, approximately $50,000 has been expended to date for installations. Upon completion, statewide coverage will be provided for the Highway Department, the highway patrol, and the county sheriff. Each, upon a separate frequency, will be able to communicate with the others.

The Washington radio system, owned and operated by the Highway Department for its exclusive use, cost an estimated $250,000. There are 62 cars, 56 trucks, and 21 snowplows operating on this system.

County systems, of course, are less expensive. One county, operating one base station and 16 mobile units with a coverage of 1,461 square miles and 912 highway miles, reported the cost of acquisition and installation as $15,612.72. Another county, operating 7 mobile units and 1 base station with a coverage of 1,300 square miles and 927 highway miles, reported a cost of $9,358.65.

A lead on operation costs may be gathered from a county in the east which reports a cost of $4.25 an hour for a total of 32 two-way mobile units, 22 one-way receiver units, and 1 base station. This hourly charge includes interest on investment, depreciation of radio equipment over 5 years, cost of repairs, land telephone line, and cost of power for operation.

It may be possible to decrease the cost of radio, per unit of road equipment operated, through the use of radio sets which can be fitted with racks and quickly transferred from a vehicle to be garaged to a vehicle going out.

Radio Towers

Although the radius of radio coverage increases with the height of the tower, highway departments try to avoid tall towers. They are expensive to build and maintain; antenna heights of 150 feet and over require aeronautical beacons, obstruction lights, painted warning stripes, etc.

A tower may be either guyed or self-supporting. The cost of a 300-foot self-supporting tower is approximately twice that of a guyed tower of equal height, though its maintenance is less expensive. A self-supporting tower may be the more practical choice when available ground space is limited, since a guyed tower often requires two acres or more.

The Rural Electrification Administration specifies design for a 100-mile per hour wind plus ½ inch of ice. This, in effect, provides for a 1-inch increase in width of surface on each steel member to resist horizontal wind pressure.

Highway Radio Frequencies

Although progress has been made, Mr. Radzikowski says that the principal problem confronting the AASHO Committee on the Use of Radio in Highway Departments is frequency coordination.

(Concluded on next page)

SKYWAYS

AIRPORTS are built with aggregate. Highways, dams, factories, bridges . . . practically *all* construction projects . . . begin with aggregate. But for the UNLIMITED construction that meets today's industrial and military needs, millions of tons of aggregate must be produced *at increasingly lower cost!*

Cedarapids equipment gives you the high capacity and economical operation that reduce per ton production costs . . . it assures the high quality finished products that meet exacting specifications . . . it brings you OPPORTUNITY UNLIMITED for your share of profit on future big jobs.

Whether you need single units, complete aggregate or asphalt plants, or soil compaction machines, be sure you have the best . . . see your Cedarapids distributor for the whole story.

Cedarapids Built by IOWA
headquarters for *Quality* EQUIPMENT

MASTER TANDEM

HERE'S the largest of the Cedarapids complete portable crushing and screening plants . . . a high capacity giant when big volume is required. For average size gravel jobs, use the Junior Tandem . . . for the smaller jobs, pick the Pitmaster. Add a Cedarapids Portable Primary and you have a rock plant. There's a size and type of Cedarapids equipment, for aggregate or black top, to meet any specification, any quantity, every pocketbook.

VIBRATORY SOIL COMPACTOR

THE Cedarapids Compactor operates on an entirely new principle...the application of controlled vibration through the pneumatic tires of a heavy roller. This powerful compacting action saves time and dollars by reaching specification densities in fewer passes.

The FCC now recognizes highway maintenance as a public-safety service in the same category as police, fire, and forestry conservation. It permits highway departments to use radio for communications directly related to public safety or essential to official highway activities. It provides frequencies in the 46 to 47-megacycle band for state highway departments, or for county departments with state approval—the use to be based on a geographical assignment plan. It also provides frequencies in the 33 to 37-mc band for cities, counties, and townships; and in the 156, 157, and 159-mc band as long as there is no interference with the railroads and Maritime Service, principal users of these frequencies. FCC rules also authorize highway maintenance radio service to intercommunicate with other stations in the public-safety service.

When a frequency is requested, the applicant must comply with Section 10.57 of Part 10 of the FCC Rules Governing Public Safety Radio Services. He must indicate, through a report based on a field test, the amount of interference his proposed station would cause existing stations operating in the same service in the band requested, and he must submit a notarized statement that all of these stations within a 75-mile radius have been notified of his intention. "In lieu of this statement and report, he may submit a statement from a frequency advisory committee, commenting upon the frequency requested and giving the opinion of the committee regarding the probable interference to existing stations. The committee must be so organized that it represents all persons involved who are eligible for radio facilities in the service concerned in the area the committee purports to represent and for which recommendations are made."

A coordinated frequency assignment plan has already been developed for the state highway departments of the nation. It was prepared and submitted for approval to the FCC by the AASHO Committee and has been accepted. As a result, when state highway departments apply for frequencies in accordance with this plan, the FCC considers that they have complied with the frequency coordination requirements of Section 10.57, and no further comment is required with such applications. City and county departments, however, since they are not included in the plan, still have to present evidence of coordination when they request a frequency. For an orderly development of radio as a means of highway communication, a coordinated frequency assignment plan for counties and cities in each state is still badly needed, said Mr. Radzikowski.

Base-to-Base Communications

Each state highway department has been assigned two frequencies in the 46-47-mc band. Highway maintenance base stations under FCC rules are primarily authorized to use these frequencies to intercommunicate with highway maintenance mobile stations; the mobile stations may communicate with the base and with each other. Communication from base station to base station is still a problem. Several highway departments have sought the use of frequencies in the 70-mc band but these are being occupied by the television industry. Experimental frequencies at 952 mc or higher have been made available to highway departments for this purpose. It has also been suggested by W. K. Beckham, Maintenance Engineer for the South Carolina State Highway Department, and Chairman of the AASHO Radio Committee for the Southeastern Region, that the FCC be requested to set aside a single channel in the 47-mc band for point-to-point use. The channel would be selected by the national Committee and the various regional committees.

The Committee

The AASHO Committee on the Use of Radio in Highway Departments consists of a secretary, a consultant, and four members — each of whom chairmans a regional committee: R. A. Hoffman, Arizona, for the Western Region; W. K. Beckman, South Carolina, for the Southeastern Region; R. M. Whitton, Missouri, for the Mississippi Valley Region. At present there is no representative for the North Atlantic Region. Frequency applications from highway departments within a state clear through the state highway department representative on the regional committee.

Mr. Radzikowski closed the progress report of the AASHO Committee with an expression of thanks for the cooperation shown it by the FCC.

Hoists and Dump Bodies

A 6-page catalog on standard hoists and bodies for heavy-duty trucks is available from A. Cresci & Son, Inc., Boulevard and Grape St., Vineland, N. J. An all-welded heavy-gage steel body, reinforced tailgate, and one-piece 8-gage floor are standard construction. Many body types are available—with running boards, braced sides, removable sides, drop sides, etc.

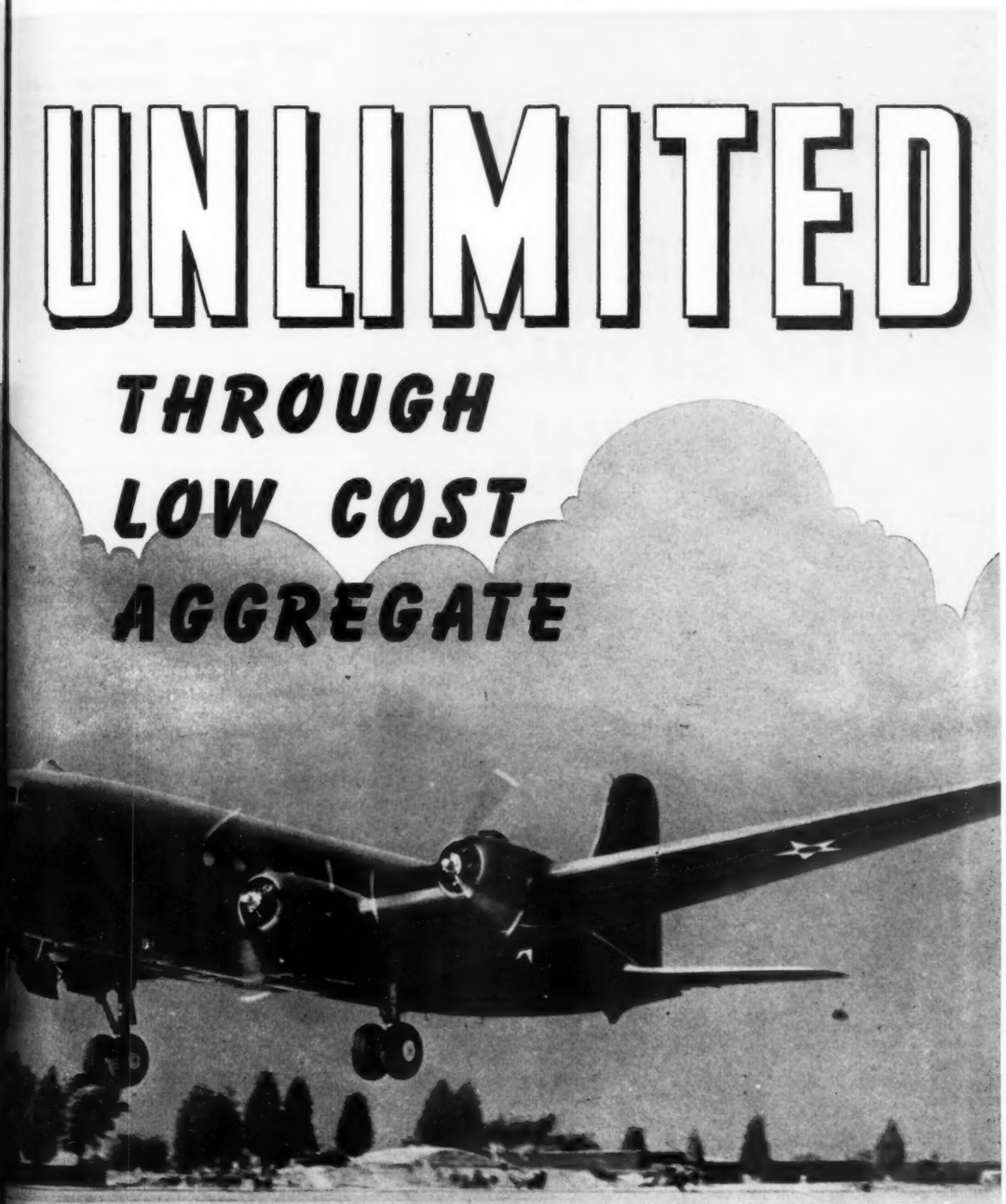
Seven different hoist models are described in the catalog, in single-cylinder straight-push types, and single and double-cylinder double-arm-lift roller types. Dumping angles up to 60 degrees are available on the roller-type hoists.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 901.

Thew Man is NPA Consultant

M. B. Garber, Director of Sales for The Thew Shovel Co., Lorain, Ohio, has been sworn in as an on-call consultant for the National Production Authority. He will remain at Thew but will be available to the NPA as an adviser on matters pertaining to the requirement, use, and production of construction machinery.

During World War II, Mr. Garber was on loan to the Government as Director of the Construction Machinery Division of the WPB.



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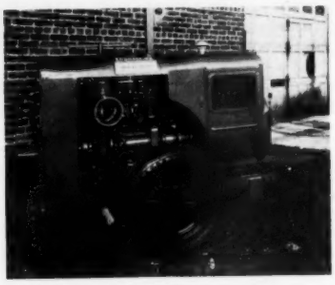
Cedar Rapids, Iowa, U. S. A.

THE IOWA LINE *of Material Handling Equipment Includes:* ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS • STEEL BINS • VIBRATOR AND REVOLVING SCREENS • UNITIZED ROCK AND GRAVEL PLANTS • FEEDERS • PORTABLE POWER CONVEYORS • PORTABLE AND STATIONARY STONE, GRAVEL AND SAND PLANTS • REDUCTION CRUSHERS • BATCH TYPE AND VOLUMETRIC TYPE ASPHALT PLANTS • DRIERS • DUST COLLECTORS HAMMERMILLS • WASHING PLANTS • VIBRATING SOIL COMPACTION UNITS • DOUBLE IMPELLER IMPACT BREAKERS

New Four-Inch Pump For Wellpoint Duty

The new Model 646, a 4-inch portable gasoline-engine-driven pump, is designed to be the "mighty midget" of the wellpoint pump line manufactured by Foundation Equipment Corp., 38th Ave. and 10th St., Long Island City 1, N. Y. Powered by the 4-cylinder Wisconsin VP4 air-cooled engine, the pump has a capacity ranging from 600 gpm at 60-foot total head to 1,000 gpm at 33-foot total head. Trailer-mounted on rubber-tired wheels, it is 98 inches long, 47 inches wide, 63 inches high, and weighs 1,580 pounds.

The 4-inch centrifugal pump is bronze-fitted and has side suction and an open impeller. The separation tank is of welded steel and is said to provide fully automatic positive air control.



"Mighty midget" of the wellpoint pump line made by Foundation Equipment Corp. is this new 4-inch unit.

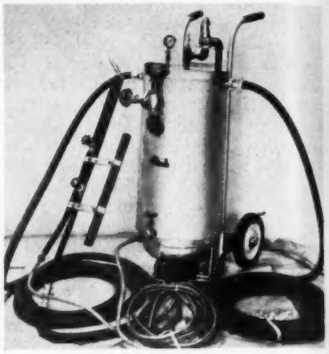
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 881.

Catalog on Oil Burners

A 16-page catalog on oil burners has been released by Ray Oil Burner Co., 1301 San Jose Ave., San Francisco 12, Calif. It covers the company's standard types including fully automatic horizontal rotary, steam-turbine-driven, combination gas-oil, semiautomatic, and pressure-atomizing models.

The booklet features a selector chart, complete specifications, capacities, and details of operation and control for each unit.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 911.



In operation, the Speedyjet steam-cleaner tank is filled with detergent or a solvent and steam is admitted in the top of the tank to put the liquid under pressure.

New Steam Cleaner Emits Pressure Jet

A new steam-jet cleaning unit, a high-pressure steam supply embodying the Speedylectric system, is announced by Livingstone Engineering Co., 100 Grove St., Worcester 5, Mass. The Speedyjet includes a high-pressure detergent tank mounted on a lightweight all-metal dolly with rubber-tired 10-inch wheels and handlebar grips; 25 feet of high-pressure steam hose for connection to the source of steam; and 25 feet each of steam and detergent hose from the tank to the Speedylectric steam lance. The unit is equipped with pressure gage, a 200-psi safety valve, and all necessary control valves. The detergent tank is thoroughly insulated and enclosed in an enameled metal case.

In operation, the Speedyjet tank is filled with detergent or solvent, and steam is admitted in the top of the tank to put the liquid under pressure. Detergent flows from the bottom of the tank through the detergent hose to the lance, where it is atomized with the steam and directed at jet velocity, under fingertip control of the operator, against the object to be cleaned. In the Speedylectric system of steam-jet cleaning, solvent, detergent, or paint stripper can be applied either alone or mixed with steam in any desired proportion.

Further information on this new steam cleaner may be secured from the company. Or use the Request Card at page 16. Circle No. 919.

Bituminous Distributors

A detailed catalog on Black Topper bituminous distributors, available in four styles with front and rear engine drives, and in a range of capacities from 650 to 3,000 gallons, has been prepared by E. D. Etnyre & Co., Oregon, Ill. Complete specifications, dimensions, capacities, weights, and mounting data are given for the full line.

The booklet devotes a number of pages to the exclusive features of the Black Toppers. It points out that with each Black Topper 135 nozzles are regularly furnished in selective sizes for applying all quantities of material up to 3 gallons per square yard in every length of bar up to 24 feet. It reports that actual tests show less than 2 per cent variation between deliveries from any given nozzle. The three available engines are fully described, as are the heating systems, valves, registering devices, and spraybars.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 894.

Patent Scaffolding Office

The Patent Scaffolding Co. of Massachusetts, with headquarters in Boston, has opened new offices and a large warehouse to handle Gold Medal and Trouble Saver scaffolds at 67½ Madison St., Hartford, Conn.

● By all standards, you'll find Marmon-Herrington *All-Wheel-Drive* Fords *the world's best buy* in multiple-wheel-drive trucks . . . best from the standpoint of performance-ability—carrying capacity—reliability—low operating and maintenance cost—ease and economy of service.

Today, Marmon-Herrington *All-Wheel-Drive* Fords are making tough jobs easy, all over the world—transporting capacity loads through deep mud, sand, snow; up steep hills and mountain grades . . . and doing it with amazing speed, ease and economy.

Marmon-Herrington *All-Wheel-Drive* Fords are available in 30 versatile models. Wheelbases range from 110″ to 220″—G.V.W. from 5,300 lbs. to 35,000 lbs.—forward speeds from 4 to 10.

Don't buy any truck until you've had an on-the-job demonstration in a Marmon-Herrington *All-Wheel-Drive* Ford. Write for name of nearest dealer and illustrated literature.

MARMON-HERRINGTON COMPANY, INC.
1523 W. Washington St., Indianapolis 7, Indiana

SERVICE AVAILABLE AT FORD DEALERS EVERYWHERE . . .

AUTHORIZED Ford SERVICE

Marmon-Herrington *All-Wheel-Drive* Fords are, for the most part, built of standard Ford Parts. Consequently, fast, efficient, low-cost maintenance and repair service is available at Ford dealers everywhere. When, occasionally, special parts are required, they are quickly obtainable through Marmon-Herrington distributors, conveniently located in principal cities the world over.

MARMON-HERRINGTON All-Wheel-Drive FORDS

Wedge and socket grooves on the Long-Bowl rope socket correspond to the correct rope diameter and prevent distortion and crushing.

New Socket Designed For Longer Rope Life

A new manganese-steel rope socket developed by Electric Steel Foundry Co., 2141 N. W. 25th Ave., Portland 10, Oreg., is designed to increase rope life. The Esco Long-Bowl socket has wedge and socket grooves corresponding to the correct rope diameter. These and the longer bowl and increased wedge angle are said to eliminate crushing and distortion.

Sockets up to and including 1⅛ inch accommodate two rope sizes using the same wedge. Sizes 1¼ to 2⅝ inches use wedges individually varied in eighths of an inch to accommodate each specific rope size.

Specifications and dimensions for both open and closed sockets may be obtained from the company by requesting Bulletin 192. Or use the Request Card at page 16. Circle No. 932.

Device Measures Two Separate Variables

A new electronic device which will give simultaneous recordings of two independent variables on a common chart has been engineered by the Brown Instrument Division, Minneapolis-Honeywell Regulator Co., Wayne and Robert Aves., Philadelphia 44, Pa. The new instrument will have application in electric logging of geophysical work, laboratory stress analysis, weather engineering, and possibly in other engineering work where it is desirable to have two independent recordings made on a single chart for comparative analysis.

A detailed description of the device, its operation, and applications may be obtained from the company. Or use the Request Card bound in at page 16. Circle No. 959.

New Rotary Drills Use Hydraulic Power

A fully hydraulic rotary drill designed for economical drilling of core holes, water wells, shot holes, etc. has been engineered by Reich Bros. Mfg. Co., 1439 Ash St., Terre Haute, Ind. Using a basic design with various gear reductions, and power input, drill pipe from 1⅜ to 6 inches can be employed to drill holes from 2 to 36 inches in diameter.

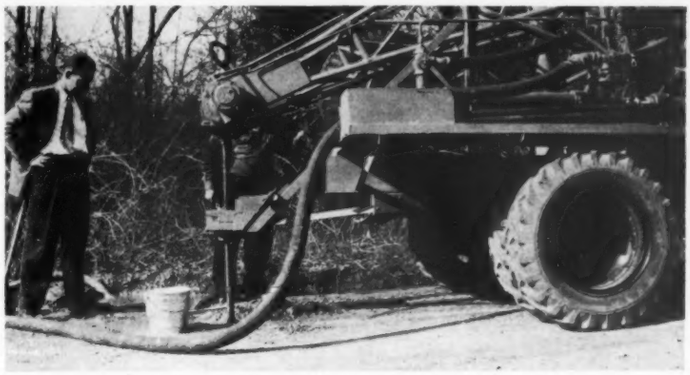
The machine is operated entirely through hydraulic power. All operations are controlled at the driller station through valves designed to give instantaneous speed and lift, and forward, neutral, or reversed rotation, without the use of clutches. All gears and moving parts, including the motor for prime power, are protected from overload through relief valves in all hydraulic circuits.

The mast is of welded tubular steel with a high factor of safety. The rotary drill, mounted on a standard long-wheelbase 1½-ton or 4-wheel-drive truck, may be equipped with an upright mast and a full 20-foot stroke, using hydraulic cylinder and cable pull-downs. Basic elements of the drill are the same for either type of mast. A sand reel, driven by a hydraulic motor, is optional equipment.

The rotary-drive gear box is driven with fluid motors which give infinitely variable speed governed by the amount of fluid pumped to them. It is protected from shock loads by relief valves in the circuit. The drill pipe is screwed on and off through the fluid motor drive. A full down-pressure of several tons is taken up completely by roller bearings in the rotary-drive gear box.

The mud pump is a Robbins & Myers Moyno rotary positive-displacement pump without pistons, valves, or reciprocating parts. The company reports that these field-tested pumps have run for thousands of hours before any parts had to be replaced. The company also points out that special drills may be built from the basic design to meet individual requirements.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 924.



Holes from 2 to 36 inches in diameter can be drilled with the new Reich Bros. rotary drill, all-hydraulic in its operation.

Greyco

Model 60 ELECTRIC DRILL

- Written lifetime guarantee
- Easy to handle
- Powerful
- All ball and needle bearing
- Compact
- 3-Jaw geared Jacobs chuck
- Lightweight
- Patented Jacobs key holder

Write: Greyhound Arc Welder Corp.

604 Johnson Ave., Brooklyn 6, N. Y.

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Completely modern . . . their Telsmith equipment units matched, balanced and co-ordinated for most efficient operation . . . these quarry and gravel plants are typically Telsmith! With their larger capacity and wider product diversification, they turn out a better product with less power and lower upkeep. You can get equally trouble-free and profitable operation—use Telsmith equipment and complete plant service. Send today for Bulletin 266.

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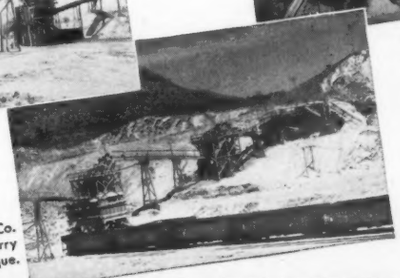
NEW YORK
Colonial Stone & Sand Co. modern, million-dollar plant, near Port Washington, Long Island

VIRGINIA
Arlington Stone Co., Leesburg, Va., produces crushed trap rock in 5 sizes to bituminous surfacing specifications.

OHIO
Camp Dennison, Ohio, all-Telsmith plant, one of six large plants of the Ohio Gravel Co., Cincinnati.

WASHINGTON
Alongside the Columbia River . . . crushing and washing plant of Howard Smith, Vancouver, Wash.

GEORGIA
Tyrone plant, Tyrone Rock Products Co. of Atlanta



WISCONSIN
Waupaca Sand & Gravel Co. plant, Custer, Wis., owned and operated by F. F. Mengel Co.

NEW MEXICO
Sharpe & Fellows Contracting Co. of Los Angeles, Calif., quarry plant near Albuquerque.

MP-4-R

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New York 17, N.Y. Chicago 6, Ill. Philadelphia 2, Pa. Cambridge 42, Mass. Milwaukee 1, Wis. Columbus 13, Ohio
Clyde Equipment Co., Portland 9, Ore., & Seattle 4, Wash. • Mines Eng. & Eqpt. Co., San Francisco 4, Calif. • Interstate Equipment Co., Statesville, N. C.
• Rish Eqpt. Co., Charleston 22, & Clarksburg, W. Va.—Roanoke 7, & Richmond 20, Va. • Wilson-Wagoner-Williams Co., Knoxville 2, &

Highway Builders Hold Utah Confab

Road-Building Equipment Exhibits Round Out 12th Annual Highway Meeting of Utah University

• BETTER engineering . . . lower construction costs . . .

These two highway themes were emphasized and re-emphasized April 2-4, as more than 400 delegates gathered in the shadows of the everlasting hills to hold the 12th Annual Highway Engineering Conference of the University of Utah at the crossroads of the west. For the first time in its 12-year history, the meeting featured displays of many lines of road-building machines, a "Junior Road Show" made possible through the cooperation of 20 equipment distributors in the Salt Lake City area.

War gloom was absent as engineers, contractors, and materials and equipment men called for better engineering and construction at lower cost. The program featured a wide variety of topics.

Rubber-Asphalt Development

Rubber-asphalt paving mixtures have now been developed to the point where all or most of the undesirable characteristics of asphalts can be changed or modified. So said H. A. Endres, Assistant Manager of Research, Goodyear Tire & Rubber Co., as he told delegates how asphalts, mixed with rubber, were less sensitive to temperature changes, flow sag, impact vulnerability, and stripping.

Endres urged that U. S.-owned synthetic-rubber plants be reopened and kept in operation so that synthetic rubber could be constantly improved. The natural product, he said, is constantly threatened by turns in world affairs.

Tracing the growth of rubber-asphalt roads from the first American installation 25 years ago in Akron, Ohio, Endres said that the use of the product appeared to hold forth much promise for future highway engineering. Even under adverse conditions of traffic and weather, rubberized pavements are proving successful, he said.

One of the important factors in the success of a rubber-asphalt pavement mix is the thorough dispersal of the rubber through the mixture, Endres explained. This has been accomplished by reducing the rubber to fine powdery particles. When it is added to the mix in this form, dispersal and thorough mixing are better assured.

Endres also explained a number of new tests which have been developed to measure properties of the rubber mixes. Tests for resiliency or rebound, low-temperature susceptibility factors, cold-flow characteristics, and low-temperature impact resistance have been developed.

In a companion presentation on this general subject, H. B. Pullar, President of Berry Asphalt Co. of Chicago and Magnolia, Ark., told how mixtures of powdered rubber, powdered asphalt, and powdered barium sulfate filler have been developed to produce a paving mix with excellent characteristics. According to Pullar's paper, the new mix combines maximum density, high stability, and excellent skid resistance: characteristics which should belong to any good paving mix. The use of barium sulfate as a filler has reduced asphalt stripping enormously, said Pullar, whose paper was read by another speaker because of Pullar's illness.

Unquestionably, Pullar said, rubber-asphalt pavements are the smoothest and easiest-riding ones America now has.

The asphalt-paving part of the program was rounded out by Bernard Gray, President of the Asphalt Institute, who called for a general improvement and widening of existing U. S. highways. More than half of our roads, considered on a national basis, are still under 20 feet wide, Gray said, and these low standards should be raised by widening programs, the construction of third passing lanes on hills and other locations where poor sight distances prevail.

Tackling the current trucking problem, Gray said it was not in the public interest either to restrict trucks too much, or to let the axle loading go too far. Gray offered the suggestion that a general survey be made for the construction of a strategic heavy-truck highway network, where heavy axle loads would be permitted to operate. Heavy loads could then be dispersed from transfer points to go over lighter-class highways.

PCA Reports

But highway engineers get about what they pay for, and the annual cost of maintenance and operation over a period of years is the only sound basis

(*Concluded on next page*)

How to pick the "Winner" for tough wire rope jobs!

SHOVEL ROPE—Tiger Brand 6 x 41 Lang Lay with Independent Wire Rope Core. Made only in Monitor grade. Has high abrasion and fatigue resistance. The wire core adds to its strength and prevents distortion. This Tiger Brand Rope has earned an enviable reputation where the digging is hardest.

• You can make money or lose it by the way you select wire rope. It's good to pick a rope like American Tiger Brand—that has proved its merits over a period of years—but that's only part of the story.

Some types of ropes are good in mud and sand—others are not. Some can stand bending fatigue caused by small sheaves, others break up under this abuse. The point is—can *you* tell by looking at a rope whether or not it will be a "winner" on your job?

Take a tip from the Tiger Brand Specialist

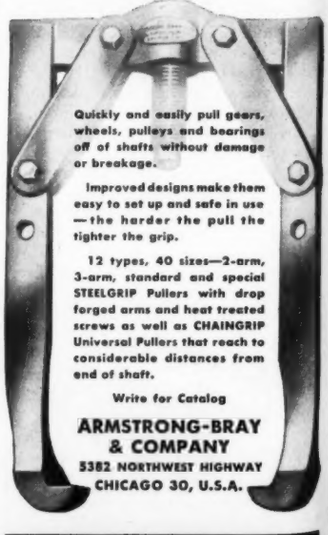
Here's a man who knows his ropes. He can tell you the construction that should be best for your particular needs. Don't hesitate to call him in. He has the experience to help you pick a winner . . . and the right rope for your job can cut your wire rope costs in half. Write for our handbook, "American Tiger Brand Wire Rope" which shows all the different constructions. Address American Steel & Wire Company, 842 Rockefeller Bldg., Cleveland 13, Ohio.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN TIGER BRAND WIRE ROPE UNITED STATES STEEL

AMERICAN TIGER BRAND WIRE ROPE
Excellay Preformed
UNITED STATES STEEL

ARMSTRONG-BRAY
GEAR and WHEEL PULLERS



Quickly and easily pull gears, wheels, pulleys and bearings off of shafts without damage or breakage.

Improved designs make them easy to set up and safe in use—the harder the pull the tighter the grip.

12 types, 40 sizes—2-arm, 3-arm, standard and special STEELGRIP Pullers with drop forged arms and heat treated screws as well as CHAINGRIP Universal Pullers that reach to considerable distances from end of shaft.

Write for Catalog

ARMSTRONG-BRAY & COMPANY
5382 NORTHWEST HIGHWAY
CHICAGO 30, U.S.A.

of any highway cost computation. So said A. A. Anderson, Manager, Highways and Municipal Bureau, Portland Cement Association, Chicago, as he compared the maintenance costs between portland-cement and asphaltic-concrete pavements. Anderson stated that the type of pavement he represents has lower rolling-friction properties, is easier on trucks, has a higher factor of safety, and reflects light better at night than asphaltic concrete.

A recent study was cited by Anderson to show this comparison:

	PCC	AC
Useful life in years	28	11.5
Salvage value in per cent	40	40
Prevailing interest in per cent	2	2
Periodic resealing-retreatment cost/mile	$	$4,224
First cost per square yard	2.85	1.49
First cost per mile (24-foot)	40,128	20,979
Salvage value	16,051	8,392
Total depreciation	24,077	12,587
Annual depreciation cost	860	1,095
Average annual interest charge	562	294
Routine surface maintenance, per year	124	303
Periodic resealing, per year	....	367
Total annual cost	$1,546	$2,059

Sutton Discusses Maintenance

Maintenance, the road builder's current headache, came up for discussion as Wyoming's Maintenance and Equipment Engineer W. E. Sutton told how changing traffic patterns have altered the methods and approach to maintenance work in his state. Today's biggest maintenance problem is the failure of surfaces and bases on old roads that were built on bases inadequate to stand 1951-type traffic, Sutton said.

Interference with traffic has caused Wyoming to change its method of treating distorted and rough bituminous surfaces, Sutton told the delegates.

"A few years ago these surfaces were scarified, remixed, and relaid to bring them back to a condition that would provide a smooth ride to the motorists", Sutton explained. "But today we first take out the sags and holes with the use of premixed oiled gravel. This is accomplished by first giving the sags and holes a light prime coat of RC-2. Premixed oiled gravel is then dumped directly on the road, laid in place with a motor grader, and thoroughly compacted. This operation brings the road surface back to a semblance of its originally constructed shape.

"The entire road surface is then primed with a light coat of MC-1. To complete the job, a light windrow of oil-mixed gravel is hauled to the road and worked from side to side with motor graders until it has been lost in the irregularities in the road surface. After a few days of exposure to traffic, a seal coat is applied. The final result is a surface as smooth as the original oil mat when first laid."

Sutton also told how Wyoming has purchased 5 small hot-mix plants to do better maintenance work, especially at high elevations. He also told how Wyoming had contracted about 50 miles of bituminous maintenance in the last fiscal year.

Reclamation and Airports

Reclamation came up for discussion, with special emphasis on the Upper Colorado basin, as Regional Director E. O. Larson of the Bureau of Reclamation at Salt Lake City called for immediate construction of at least several of 10 dams scheduled for the Upper Colorado. Larson said the hydroelectric-power market was expanding at the rate of 500,000,000 kilowatts per year, and that 134 projects were needed in the Colorado Basin.

The ten dams now contemplated along the Upper Colorado watershed have been spotted in long, narrow canyons to minimize evaporation from the reservoirs, Larson said. The ten dams would produce about 9,500,000,000 kwh yearly, and would represent an investment at current rates of $1,139,000,000. The figure in excess of one billion "shouldn't be shocking", Larson said, in view of budget figures statewide and nationally which exceed that figure.

Airports, too, came up for discussion as they relate to highways. The construction of flight strips every 30 miles along main-traveled routes where highway travel is prevalent was urged by H. K. Glidden, consulting engineer of Boise, Idaho. William R. Wallis, of the Los Angeles office of Civil Aeronautics Administration, told how jet aircraft is compounding the engineering problems of the modern airport. Jet blasts and heat are causing bituminous damage, he said, but high-type asphaltic-concrete pavements and good armor coats are resistant to jet blasts which often place the surfaces under 365-degree heat.

Delegates Visit Exhibits

Delegates and other speakers on the highway-conference program visited machinery exhibits, both in the Coliseum and outdoors at the Utah State Fair Grounds. Virtually every equipment distributor in the Salt Lake area exhibited a complete line of road-building machinery, and several of the distributors made demonstrations.

Included in the list of exhibitors were: Colorado Builders & Supply Co.; the Line Material Co.; Portland Cement Association; C. H. Jones Equipment Co.; H. H. Nielsen Machinery Co.; Verne Taylor Machinery Co.; Heiner Equipment & Supply Co.; Western Machinery Co.; Lund Equipment Co.; The Eimco Corp.; Rasmussen Equipment & Supply Co.; Robison-Kershaw Machinery Co.; Foulger Equipment Co.; Arnold Machinery Co.; J. K. Wheeler Machinery Co.; the Lang Co.; and Kimball Equipment Co.

Movies, visual demonstrations, and trade literature were available at the machinery exhibits, and delegates returned to their respective states with a better appreciation of the importance of modern equipment in the highway construction and maintenance picture.

"BERG" Concrete Surfacer

A light-weight, portable, electric motor-driven Concrete Surfacer consisting of the Model R-2 Right Angle Head and Model AS Motor Unit.

Ideal for surfacing concrete construction and other applications.

Quickly converted into the Model V2-AS Concrete Vibrator for Internal vibration by substituting the Model V2 Vibrator Unit for the above Head.

The Concrete Surfacing Machinery Co.
4665-4669 Spring Grove Avenue, Cincinnati 32, Ohio

Five hundred trucks can't be wrong!

Here are just two of the five hundred big trucks operated by the Midwest Transfer Company—headquarters in Chicago. It's a big job keeping this fleet in top working order, but according to Syd Kramer, an official of this company, STANOLUBE HD Motor Oil helps a lot. Here's what he reports:

"We have used STANOLUBE HD Motor Oil exclusively in our fleet of five hundred trucks for over five years. In that time, our maintenance costs have been very low due to the long periods between any necessary overhauls on motors.

"With this oil many of our engines have operated 85,000 miles without a major overhaul. We attribute this highly satisfactory performance to your STANOLUBE HD Motor Oil and are happy to recommend this oil to all fleet owners."

Mr. Kramer's experience is typical. Fleet operators throughout the Midwest have discovered the benefits offered by STANOLUBE HD under severe conditions—high temperatures, heavy loads, or low temperature, intermittent operation. A trial will convince you. Take advantage, too, of Standard's automotive engineering service and Standard's widespread supply points.

To put STANOLUBE HD Motor Oil to work in your fleet, phone your local Standard Oil office, or write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANOLUBE HD
REG. U. S. PAT. OFF.
Motor Oil

STANDARD OIL COMPANY (INDIANA) STANDARD

Metallic Coatings Can Replace Paints

"Metals sprayed from a gun in much the same manner as paint can substitute for paint, do a better job, and cost less in many applications." This was the claim of H. S. Ingham, Chief Engineer of Metallizing Engineering Co., Brooklyn, N. Y., in describing the metallizing process at a recent session of the American Society of Tool Engineers.

The metal—steel, zinc, copper, bronze, etc.—is fed in wire form into the gun where it is heated to its melting point. A jet of air then drives the metal from the gun in a mist of microscopic droplets. When these droplets strike the surface to be sprayed they adhere and build up a coating.

At present, several applications of the method are used in industry where zinc, for example, is sprayed onto a steel surface to prevent rust. In this application the zinc coating is reported to give superior protection and cost less than painting. Other applications include spraying bearing metals on pistons, and building up worn machinery parts so they can be re-used rather than discarded.

Although the metal comes from the gun in molten form, the droplets are so small that they do not burn and can be sprayed directly onto cloth or similar materials, the company says.

Rubber-Lined Valve

A heavy-duty rubber-seated cast-iron valve has been developed for emergency gas or liquid shutoff, by R-S Products Corp., 4600 Germantown Ave., Philadelphia 44, Pa. With an angular seating vane for wedge-type closure, the rubber is compressed around the periphery of the vane to give positive shutoff even around the shaft bosses, the company states. The rubber flanges replace the usual flange gaskets.

The valve is completely cycled and operated by a directly connected motor-driven pump, sealed in oil. The hydraulic pressure raises the counterweight for the open position. When the valve is fully open, the operating motor is cut off by an integral switch. While the oil operator is energized, current consumption drops to a minimum. Should current fail, the oil operator is released, the counterweight drops, and the valve is closed. Valve action can be reversed. The No. 763 is available in sizes from 2 to 72 inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 858.

Perlite Curtain Wall Withstands 4-Hour Fire

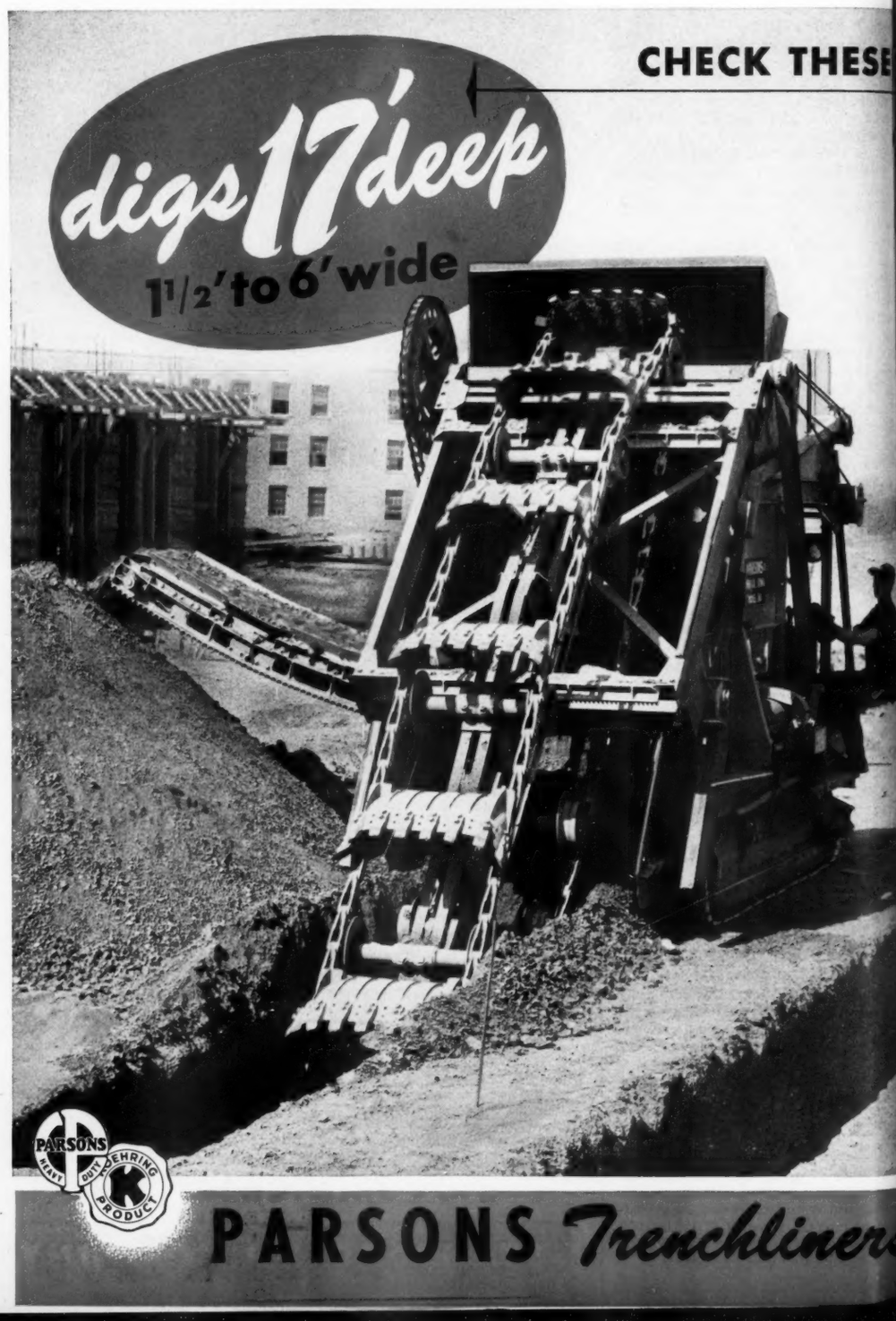
A newly developed 6-inch perlite curtain wall has received a 4-hour fire rating from Underwriters' Laboratories, Inc., according to a report issued by Great Lakes Carbon Corp., 18 E. 48th St., New York 17, N. Y. The construction technique for this unique curtain wall (one-half as thick and weighing about one-fourth as much as a conventional wall) was worked out by McNulty Bros., lathing and plastering contractor of Chicago, with Bruce A. Gordon Co., engineer, also of Chicago. The Underwriters' test was sponsored jointly by Aluminum Co. of America, McNulty Bros. Co., and Great Lakes Carbon Corp., producer of Permalite perlite aggregates used in the test.

The wall consists of an exterior layer of Permalite portland-cement plaster or concrete 4 inches thick, and an interior layer of Permalite gypsum plaster 1 inch thick, separated by a furring channel. Paper-backed metal lath is affixed to and spaced 1 inch from the exterior edge of vertical structural-steel supports. The steel supports allow for expansion and contraction when bolted together. They are provided with metal fins which extend through the concrete for receiving various types of weatherproof facade which might be applied when this construction is used as an exterior panel wall. For interior wall application, the fins would be omitted. Permalite cement plaster, 4 inches thick, applied with the E-Z-On Machine, embeds the vertical structural-steel supports.

After the cement plaster or concrete is in place, ¾-inch furring channels are erected and paper-backed metal lath is wired on. Permalite gypsum base-coat plaster is then applied with the E-Z-On machine in scratch and brown coats, followed by a lime-putty finish coat, to reach total plaster thickness of 1 inch. A similar type of construction, using aluminum lath in place of paper-backed steel lath, will be used as a back-up material behind aluminum sheet panels which form outside walls of the new 30-story Alcoa Building in Pittsburgh, Pa.

Information on the curtain-wall construction test, including a copy of Underwriters' Laboratories Report 3302, may be obtained from Great Lakes Carbon Corp., or by using the Request Card at page 16. Circle No. 909.

George S. Patterson, recently named Flying Businessman-of-the-Month by the Ryan Aeronautical Co., lands his Super 260 Navion on rough fields alongside sites where his firm, the John L. Hudson Co., is building prefabricated grain bins. This is a job at Overton, Nebr. Hudson specializes in this type of construction.

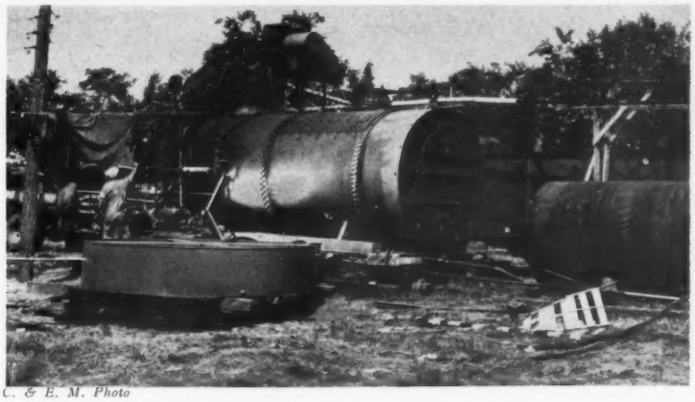


Rock Asphalt Paves 21½-Mile Road Job

It Is Laid on Bituminous-Coated Aggregate Binder Also Used to Widen the Highway From 18 to 22 Feet

• THE large 1950 resurfacing program of the State Highway Commission of Indiana included one rock-asphalt job 21½ miles long on State Route 43 in the northwest section of the state. This particular contract in the LaPorte District also included widening the highway from 18 to 22 feet, and laying a course of bituminous-coated aggregate as a binder for the nonskid rock-asphalt surface. The south end of the job began one mile north of the White-Pulaski county line and extended northerly 9.55 miles to the intersection of State Route 14. After an 8-mile gap, that had been recently paved, the project picked up again at the Pulaski-Starke county line, and went northerly 11.93 miles to a point about 1½ miles north of La Crosse.

Work started on May 25, 1950, after the Highway Commission awarded a contract to the McMahan Construction Co. of Rochester, Ind., on its low bid of $389,344. The existing road was also a rock-asphalt surface, 18 feet wide, on a penetration-macadam base. This was widened 2 feet 3 inches on each side to provide a 22-foot 6-inch base for the new 22-foot surfacing.



C. & E. M. Photo

Steam jets heat a car of Kentucky rock asphalt for an Indiana resurfacing job; steam furnished by a 125-hp Leffel boiler.

The shoulder strip along the pavement was first scarified by a motor grader, after which a widening trench was opened up by a Buckeye trenching machine. An Apsco spreader then laid a 1½-inch cushion of No. 63 stone in the bottom of the trench. All stone for the widening and binder came from the nearby Francisville Stone Quarry at Francisville, Ind., just east of the job.

The gradation of the No. 63 stone was as follows:

Sieve Size	Per Cent Retained
1½-inch	0
1-inch	0—5
¾-inch	10—25
½-inch	20—50
No. 4	45—75
No. 30	75—90

Bituminous-Coated Aggregate

The cushion layer of stone in the 9½-inch-deep x 2-foot-3-inch-wide trench was compacted by a Galion trench roller. The remaining 8 inches of depth was filled with two 4-inch layers of bituminous-coated aggregate that consisted of No. 63 stone mixed with AE-200 asphalt emulsion. By weight the bitumen was held to between 3.8 and 4 per cent. Mixing was done in the contractor's Barber-Greene asphalt plant located at the stone quarry, and the material was then hauled to the job in trucks and laid in the trench by the Apsco spreader.

The first 4-inch layer was compacted by the trench roller, but as the second layer was brought up even with the rest of the pavement the top compaction was done by a heavier Huber 3-wheel 10-ton roller. Before the binder course was laid over the pavement, the old surface was primed with 0.1 gallon to the square yard of AE-200, put on by a Littleford 1,000-gallon distributor at a temperature of 70 degrees F. Then the binder was laid 22½ feet wide in two courses having a total thickness of approximately 3 inches, and a total weight of 278 pounds to the square yard.

An Adnun Black Top Paver laid the cold-mix which was similar to that used in the widening operations; the average temperature was 125 degrees F. The lower course, which leveled off any irregularities in the old road, was completed over the entire project before the second layer was put on. Each course was laid half width at a time, and rolled by both a 10-ton tandem and a 10-ton 3-wheel Huber roller. Up to 28 trucks holding 10 tons each were used in hauling the coated aggregate a maximum distance of 32 miles. Average production was 1,500 tons in a 12-hour day, but in the last four days of binder-laying, this figure was stepped up to average 1,668 tons a day of material laid.

Rock Asphalt

Before the rock-asphalt surfacing was put on, the top course of binder was sealed with a shot of AE-150 asphalt emulsion applied at the rate of 0.2 gallon to the square yard. The bitumen was then covered with 15 pounds to the square yard of No. 12 crushed stone, put on with a Buckeye spreader.

(*Concluded on next page*)

PARSONS 310 TRENCHLINER Big PRODUCTION ADVANTAGES

Wide Work Range . . . Model 310 digs 1½ to 4½' wide at 17' depth . . . and up to 6' wide at 11' depth.

16 Cutting Widths with single boom, 5 additional with dual boom.

45 Digging Feeds produce 8" to 15'-6" of trench per minute.

Shiftable Boom for offset digging, cuts within 15" of either side.

Telescopic Boom locks at 14" intervals for quick depth changes.

1-Min. Power-Shift Conveyor discharges spoil to right or left.

Friction Clutch controls digging, boom hoist, steering, traction, engine.

Automatic Safety Clutch protects all machinery from shock loads.

Tractor-Type Crawlers are self-cleaning . . . 3-point suspension mounting provides 8" oscillation.

YOUR Parsons distributor can show you many other heavy-duty features that assure more feet of trench per hour at lowest cost per foot with this big 310 Trenchliner. Ask, too, about the 4 smaller Parsons models, including rubber-tired, utility-size Trenchliner . . . or send for catalog.

PARSONS COMPANY
Newton, Iowa
(KOEHRING SUBSIDIARY)

NO PUSH, NO PULL with Kwik-Mix Moto-Bug®

Moto-Bug has *full power* forward *and reverse* . . . for traveling 1½ to 4 m.p.h. in either direction, for backing up, for spotting. Operator takes it easy, rides on rear step, has positive steering wheel for fast, easy maneuvering. *Standard-make*, 4 h.p. gasoline engine takes full load up 20% ramp. Big hopper holds 10 cu. ft. . . . interchanges with 1200-lb. capacity flatbed, fork lift, scraper blade. Send for catalog now.

KWIK-MIX (Koehring Subsidiary)
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Over 100,000,000 Yds. Johnson experience

Johnson-engineered Central Mix plants have poured over 100 million cubic yards of concrete . . . experience available to you for top efficiency. Central Mix Plant, illustrated, has All-Welded Portable Section Bin, cement elevator, storage silo, big 56-S concrete mixer, and stockpiling system. For complete plant installations, all sizes, types, or auxiliary plant equipment, it will pay you to call your Johnson distributor, or write to us.

C. S. JOHNSON (Koehring Subsidiary)
Champaign, Ill.

NO BLOCKING ON GRADES with Koehring 205

On grades as steep as 30%, there is no need to block the crawlers on this Koehring 205. Big friction brakes, controlled from cab, securely hold both crawlers . . . provide necessary flexibility to cushion brake assembly against operating shocks. No blocking saves time on *every* job. For excavators or cranes, check your Koehring distributor . . . 4 heavy duty sizes, 7¾ to 79½ tons lift capacity, ½ to 2½-yards dipper capacity.

KOEHRING COMPANY
Milwaukee 16, Wis.
W62

Rock Asphalt Paves 21½ Mile Road Job

(*Continued from preceding page*)

The gradation of the No. 12 cover stone was as follows:

Sieve Size	Per Cent Retained
½-inch	0
No. 4	20—50
No. 8	65—100
No. 30	96—100

Rock asphalt was furnished by the Kentucky Rock Asphalt Co. of Rocky Hill, Ky., where it was mined. Its specifications were simple—the material had to be out of the ground at least six months before it was used; it had to contain not less than 6.3 per cent nor more than 8.5 per cent of bitumen by extraction; and for gradation requirements no material was to be retained on the ¾-inch sieve, not more than 1 per cent on the ½-inch sieve, and not more than 20 per cent retained on the No. 4 sieve.

Heated With Jets

From Rocky Hill, Ky., the rock asphalt was shipped in gondola cars to a siding of the Monon Railroad at San Pierre, Ind., over 300 miles distant. The siding was favorably situated adjoining State Route 43, and 10 miles south of the north end of the project. There a heating plant was set up to heat the rock asphalt to an average temperature of 200 to 210 degrees F before it was unloaded and placed.

Steam was provided by a Leffel Scotch marine horizontal-type 125-hp boiler which was fired by a single Ray oil burner. An adjoining 4,000-gallon horizontal tank stored the necessary fuel oil for the boiler. Water for its use was pumped from two wells at the siding by a Flint & Wallace 450-gpm pump into a circular 1,000-gallon storage tank. From the tank the water was pumped to the boiler by either a steam or electric pump. The fully automatic boiler developed 150-psi pressure at the gage, and 115-psi pressure at the end of a 2½-inch steam-jacketed line that ran along the track on a wooden framework.

C. & E. M. Photo

At the railroad siding a Lima crane unloads the hot Kyrock into a Dodge truck.

This line fed steam to 20 jets—5-foot lengths of ½-inch pipe—that were pushed down through the rock asphalt nearly to the floor of the car so as to heat the material from the bottom up. These 20 jets drove out all the moisture, and heated a car with 55 to 60 tons of material to 200 degrees F within two hours.

Laid by Machine

Cars were unloaded by a Lima crane equipped with a 35-foot boom and an Owen 1-yard clamshell bucket into a fleet of four trucks averaging 10 tons a load. On the road the rock asphalt was laid half-width at a time by a Barber-Greene Finisher at the rate of 40 pounds to the square yard, giving a thickness of about ¼ inch. The course was compacted first by a Buffalo-Springfield 5 to 7-ton tandem, and then by a Galion 7 to 10-ton tandem roller. Average daily production was 250 to 300 tons.

Quantities and Personnel

By September 10 the project was completed and the road was again open to traffic which had been detoured over parallel highways during the rock-asphalt surfacing only. The McMahan Construction Co. employed an average force of 25 on the project, not including truck drivers, under the direction of Edward Boswell, Superintendent.

The most costly item in the contract was the rock asphalt at $20 a ton. Quantities of the principal items were as follows:

Bituminous-coated aggregate, binder and widening	58,800 tons
Cover aggregate	2,100 tons
Bitumen, prime	33,743 gals.
Bitumen, seal	51,000 gals.
Rock asphalt	5,500 tons

For the State Highway Commission of Indiana, Ed M. Davis was Project Engineer. John A. Kelley is District Engineer of the LaPorte District in which the project was located. The Commission is headed by Samuel C. Hadden, Chairman, with Ray H. Bower, Chief Engineer, and F. L. Ashbaucher, Engineer of Road Construction.

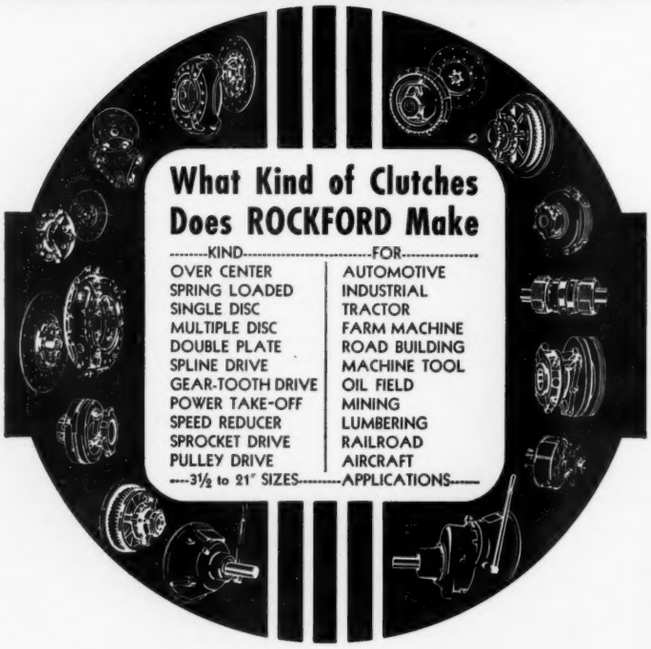
A New Pipe Coating For Acid Protection

A new coating, formulated expressly for use where corrosion from soil or air-suspended acids attack metal structures or pipelines, has been developed by The Warren Refining & Chemical Co., 750 Prospect Ave., Cleveland 15, Ohio. Pro-Tek-To is a cold-application coating that requires no heating, special mixing, or preparation.

It is made from heavy Gilsonite asphalt and long thoroughly matted asbestos fibers to give both toughness and elasticity. On pipeline work it can be applied by paint brush or by pipe-coating machinery. Pro-Tek-To pipe coating can be used with or without conventional wrappings. It is equally effective, the company says, either indoors or out; it eliminates the danger of accidental burning in hot applications; it is impervious to severe temperature change; and it retains its mastic properties through a long service life.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 918.

CONTROL POWER BETTER



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ROCKFORD CLUTCHES

HENRY . . . BUILDERS OF EARTH-MOVING EQUIPMENT

HENRY HYDRAULIC BACKHOES
Speed up and cut costs on every digging job. Easy to operate. Bucket has 7' digging depth . . . maximum reach 11' and swings 60° to either side. Bucket sizes 12", 14", 16" and 18".

HENRY HYDRAULIC SCRAPERS
Digs, Hauls, Dumps, Spreads. Saves time and labor. All steel constr. Fully guaranteed. Five models from 1¼ yd. to 6 yd. capacity.

HENRY HYDRAULIC BULLDOZERS
Inside pushbeam permits use of shorter moldboard, giving tractor added reserve power. Henry Dozer DI-84-9 for Int'l. tractor T-9 or TD-9. Henry Dozer DI-84-5 for Allis-Chalmers HD5B tractor.

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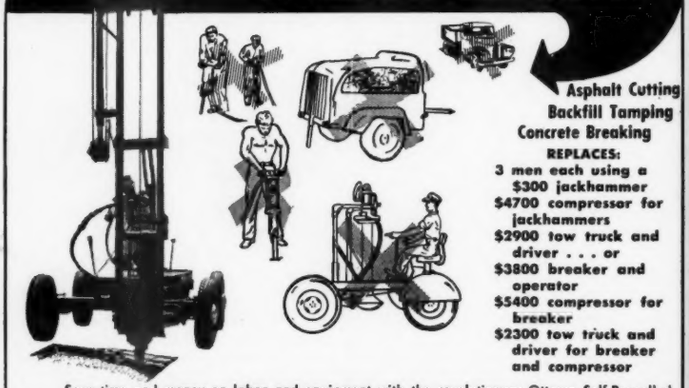
P.O. BOX 720 — DEPT. CE-551
TOPEKA, KANSAS
Write For Complete Details

HYDRA-HAMMER and ONE MAN REPLACES ALL THESE!


Asphalt Cutting
Backfill Tamping
Concrete Breaking
REPLACES:
3 men each using a $300 jackhammer
$4700 compressor for jackhammers
$2900 tow truck and driver . . . or
$3800 breaker and operator
$5400 compressor for breaker
$2300 tow truck and driver for breaker and compressor

Save time and money on labor and equipment with the revolutionary Ottawa Self-Propelled Hydra-Hammer. No skilled operators needed for this multi-purpose tool, any man able to drive a truck can learn to operate the Hydra-Hammer in an hour.

The Hydra-Hammer travels under its own power up to 12 MPH. Converts from travel to work position by elevating the tower and shifting gears. No extra engine or hose couplings to slow production. The 400-pound hammer falls free, eliminating shock and high maintenance costs.

Write today for descriptive booklet . . . see how you can reap profits from the amazing Self-Propelled Hydra-Hammer!

Ottawa STEEL PRODUCTS, Inc.
INDUSTRIAL DIVISION
OTTAWA, KANSAS • U. S. A.

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Use the Request Cards Between Pages 16 & 17 To Obtain Further Information or Printed Matter on Any Product Advertised or Described Editorially in This Issue

Can Safety Be Built Into Our Highways?

(*Continued from page 3*)

faces allowed speeds of 30 to 35 mph. The second step, then, was to improve alignment. No accident statistics are necessary to convince you that making easier curves on our roads was a safety improvement.

Pavement Width

Improving alignment, which allowed relatively higher speeds, was indirectly responsible for another type of accident: that is, side-swipe accidents due to narrow roads. At very low speeds two cars can pass nicely on a 12-foot pavement, but at 35 miles an hour it is a rather harrowing experience, particularly if the shoulder alongside a pavement consists of mud. The cure for this type of accident of course is obvious. Widen the roads.

Sight Distance

At this stage in the history of road building, sight distance became a factor. Now sight distance, although it may have a fancy engineering definition, means just what you think it does: how far ahead the driver can see. I would like to give you the results of a study of the relationship between sight distance and accident rates. This study covered a total of 500 miles of 2-lane highway on which accurate sight-distance measurements had been taken. There were 44 miles on which the sight distance was less than 800 feet and the accident rate was 2.40 per million vehicle-miles (on an average of two year's experience). There were 91 miles with sight distance between 800 and 1,500 feet, on which the accident rate was 1.85 per mvm. There were 87 miles with sight distance between 1,500 and 2,500 feet, which gave an accident rate of 1.47. The balance of the mileage, amounting to 281 miles, had sight distance greater than 2,500 feet and an accident rate of 1.10 per mvm.

At the present, all highway designers are very conscious of sight distance, and all designs are thoroughly studied with a view to providing as good sight distance as is economically feasible.

Shoulders

As our highways became more crowded, another type of accident became prevalent. This was the accident due to the stalled vehicle along the roadside. To give parking room off the pavement, shoulders were provided. These shoulders also served as maneuvering room in emergencies. A careful study of accident rates and shoulder widths on 1,169 miles of 2-lane highway on the Interstate Highway System in California reveals that the accident rate varied from 3.42 for sections of road without shoulders to a low rate of 1.65 for shoulders 8 feet and over.

Grade Separation

One of the worst accident problems that confronts the highway engineer is the intersection of two roads, streets, or highways. Up to a certain point, traffic signals can handle the intersection problem by alternately allotting time to the different movements in the intersection. However, this is not foolproof. Also, neither highway can carry its maximum capacity, since the traffic must be stopped on one highway while the other traffic is allowed to go. Fortunately there is one solution for the intersection problem which not only reduces the hazard to a minimum but also increases the capacity of both highways; that is, of course, the grade separation.

With 35 per cent of all accidents on all highways occurring at intersections, and nearly 50 per cent on multilane highways, it is readily seen that grade-separation structures at important intersections are a must from a safety standpoint. No other highway improvement strikes at such a large percentage of all accidents. Since grade separations also reduce congestion on both of the roadways involved, it is my opinion that more thought should be given to this type of improvement.

Divided Highway

With the advent of multilane highways and their heavy volumes of traffic, the head-on and head-on side-swipe type of accident came back into prominence. This type of accident was one of the reasons for widening our original 2-lane highways, but on multilane highways it appeared that widening of pavement was not sufficient. Due to crowding of vehicles in adjacent traffic lanes, head-on collisions became more prevalent. And because of relatively high speeds on multilane highways, these head-on collisions were often quite spectacular.

The outgrowth of the engineer's

(*Concluded on next page*)

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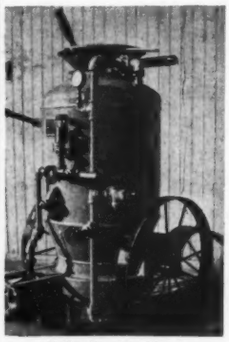

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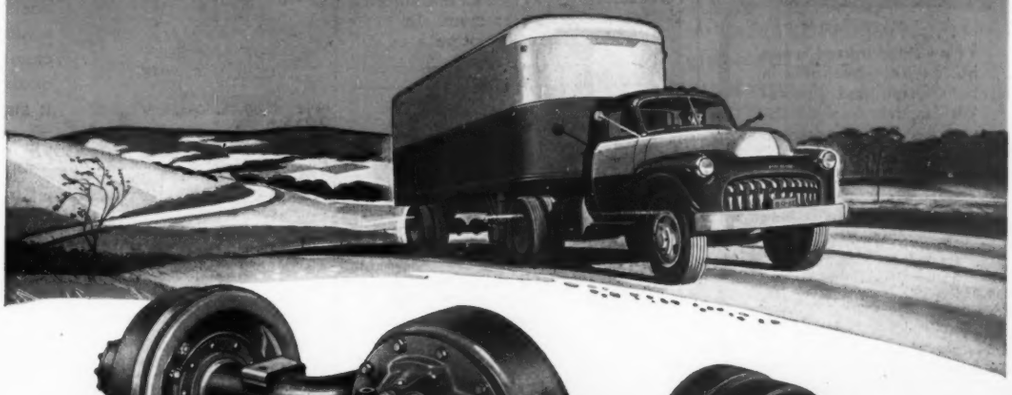

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Can Safety Be Built Into Our Highways?

(Continued from preceding page)

efforts to combat this hazard was the divided highway. As I mentioned earlier, head-on collisions can be eliminated by building a wall to separate opposing lines of traffic. However, we find that other accidents are caused by the wall itself. On the other hand, if no barrier is placed in the center division strip there will still be some head-on collisions. The ideal degree of traversability of center dividing strips has not yet been determined, but there is some evidence to indicate that there is no substitute for space. A wide flat division strip that is traversable in an emergency is at least as safe a dividing strip as curbs, and even safer than a more positive barrier.

There are a number of other advantages to a divided highway in addition to the reduction of head-on collisions. A center division strip, particularly if of adequate width, allows development of storage space for left-turning cars at intersections, thereby taking much of the hazard out of this particular maneuver. Another distinct advantage is the ease and comfort of driving on a divided highway. Records for the rural state highway system in California indicate that the accident rate for 4-lane divided highways is about 16 per cent less than the accident rate for 4-lane undivided highways.

To recapitulate, I have discussed: first, smooth roadway surfaces; second, flatter curves; third, wider pavements; fourth, adequate sight distance; fifth, wider shoulders; sixth, grade separations; and seventh, divided highways. It would then appear that by combining all of these measures we would have accomplished about all in the way of accident reduction that is possible by engineering means.

It soon became apparent, however, that highways of this type can gradually deteriorate from a safety standpoint. You have no doubt all seen certain sections of highway, which were once free-flowing, gradually become congested and hazardous due to a succession of businesses developing along the roadside. The answer in California was the freeway law which was enacted in 1939 by the legislature.

Access Control

Legally, in this state, the word freeway means a road on which the abutting-property owners have no right or only limited right of access to the main lanes of travel on the highway. By common usage the term freeway has come to mean not only a controlled-access highway but also a highway in which most or all of the items previously discussed have been incorporated. When a highway is built as a freeway with no private access nor any intersections at grade, it is commonly known as a full freeway.

We have now accumulated records on full freeways which have operated for a composite total of 79 mile-years; in other words, the equivalent of one mile of freeway operating for 79 years, or 79 miles of freeway operating for one year. The total of all accidents on full freeways gives a rate of 1.13 accidents per mvm. The rate for the entire rural state highway system in California is 2.41 accidents per mvm. In other words, the total accident rate on full freeways is less than half that on all other rural state highways.

Another interesting point about this accident rate is the fact that the average daily traffic on these freeways was 31,500 vehicles per day. The average daily traffic on the California state highway system as a whole is 2,600 vehicles per day; so in spite of carrying traffic volumes about twelve times as high as the statewide average, the freeway accident rate is much less.

Now, you may ask, how about the severity of these accidents. It has often been said that because of the higher speeds on freeways, accidents are apt to be more serious. This popular conception is not borne out by the records. On our rural state highway system the fatality rate is 10.2 persons per 100 mvm. On the full freeways the total rate to date is 2.1 fatalities per 100 mvm. The fatality rate on full freeways is only slightly over one-fifth of the fatality rate on the rural state highway system. Similar low fatality rates are characteristic of full freeways in other states throughout the country.

Still a Long Way to Go

Now perhaps you might ask why, since we appear to have found ways to design and build safe highways, do we still have so many motor-vehicle accidents. The answer is that as yet only a very small percentage of our roads, streets, and highways are improved to standards which will provide maximum safety. For instance, the total motor-vehicle travel on full freeways represents only 1.3 per cent of the total motor-vehicle travel in the entire state for the year 1949. Obviously many streets and roads can never become freeways, but it is possible to build into every traffic artery safety commensurate with the anticipated use of the facility.

With sound statistical data to prove that highway engineers are on the right track in highway design, safety will be built into our street and highway system as rapidly as funds permit.

From an address delivered at the Governor's Traffic Safety Conference, Engineering Section, in Sacramento, Calif., December 7, 1950.

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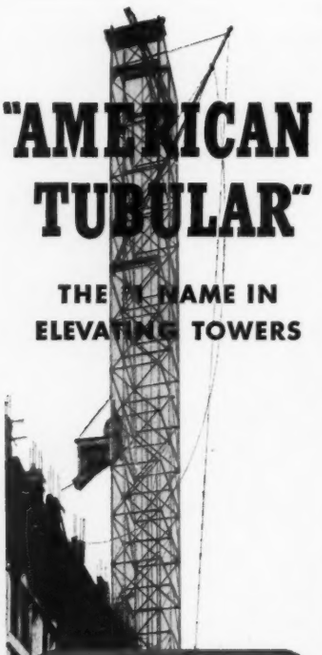

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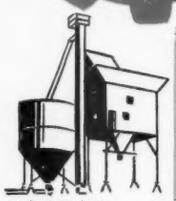

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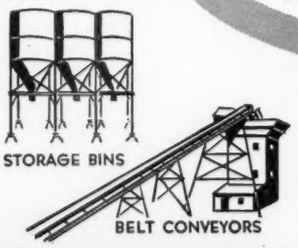

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Traffic-Engineering Contest

The Association of Casualty and Surety Companies has announced its 1951 "Getting Results Through Traffic Engineering" contest. It is offering a $100 award to the engineer, policeman, or traffic official who submits the best example of a contribution by traffic engineering to highway safety.

The 1950 first prize went to J. Edward Johnston, State Traffic Engineer, Nebraska Department of Roads and Irrigation, for his entry which told how accidents had been reduced 91 per cent at the junction of U. S. 30 and Nebraska Route 15, near Schuyler, Nebr. An unwarranted traffic signal was removed at this junction, and stop signs and warnings were installed. Only one very minor accident occurred during the first year after the change was made, compared with 11 during the preceding twelve months.

Entries for this year's contest may be submitted at any time during 1951 to the Accident Prevention Department, Association of Casualty and Surety Companies, 60 John St., N. Y. 38, N. Y.

Unfinished Plant Produces

Twelve months after it purchased 300 acres of unimproved land near Joliet, Ill., Caterpillar Tractor Co. produced its first scraper in a plant still under construction on that land. The scraper was assembled from parts supplied by the company's Peoria factory and subcontractors.

Vice President T. R. Farley is in charge of operations at the 750,000-square-foot Joliet plant which will be in full operation by January, 1952.

Cleco Philadelphia Moves

The Philadelphia office of the Cleco Division of the Reed Roller Bit Co., Houston, Texas, has moved to 5220 N. 5th St., Philadelphia 20, Pa.

Samuel Rosoff, Builder Of N. Y. Subways, Dies

Samuel R. Rosoff, 68, President of Samuel R. Rosoff, Ltd., of New York and several subsidiary companies, died recently in Johns Hopkins Hospital.

His firms dug about a quarter of New York's subways, built roads and canals in many countries, and at his death were completing a 17-mile $19,000,000 tunnel linking the Baltimore city water system with the Patapsco River. In recent years his firm did much work in Mexico where he built a $10,000,000 aqueduct in Puebla for the Mexican government.

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U. S. Forest Service Builds Brush Mower

Heavy-Duty Machine Trims 3-Inch-Diameter Brush Along the Roadsides in Huge Angeles National Forest

• AFTER two years of trial and error, the U. S. Forest Service has developed a heavy-duty brush mower to remove dense growth from forest roadsides. The machine, which is presently assigned to the Angeles National Forest in Los Angeles County, Calif., cuts brush up to 3 inches in diameter. It averages a mile of completed brushing each day, and occasionally doubles that figure.

This type of mower was originally designed by the Forest Service Experimental Equipment Shop at Portland, Oreg. California Region personnel redesigned the present model to cut the larger and tougher brush encountered along the California forest roadsides. The mower as now constructed has reduced brushing to about 5 man-days a mile.

Formerly, forest roads had to be brushed about once every 5 years, and it took a 20-man labor crew to do the work. Hand-labor work is dangerous because of the possibility of falls, rattlesnakes, and accidental axe wounds. The machine has eliminated all that, and does a job that still lasts 5 years. Only a very small labor crew is used with the machine. The men throw the brush down the roadside slopes. It is not an extra operation; they had to do this when they cut by hand.

Mounted on Grader

The mowing blade is mounted on a grader frame. The mowing device consists basically of a heavy frame, a cable-controlled hoisting arrangement to raise and lower the sickle blade, the sickle-blade assembly including its power arrangement, and counterweights on the opposite side of the grader machine.

The sickle is driven direct from the grader's power shaft. A multiple V-belt transmits power from the driveshaft to an intermediate driveshaft. Gears on the end of the intermediate shaft tie to a chain drive, which drives the sickle bar.

The present arrangement is now time-tested and proved. There were several initial bugs which had to be removed. For example, the intermediate shaft terminated originally with V-belts to drive the sickle blade. It didn't work, but the changeover to a chain drive solved the trouble. The last chain on the machine lasted almost a year before it had to be replaced.

Too, the sickle-bar stud kept break-

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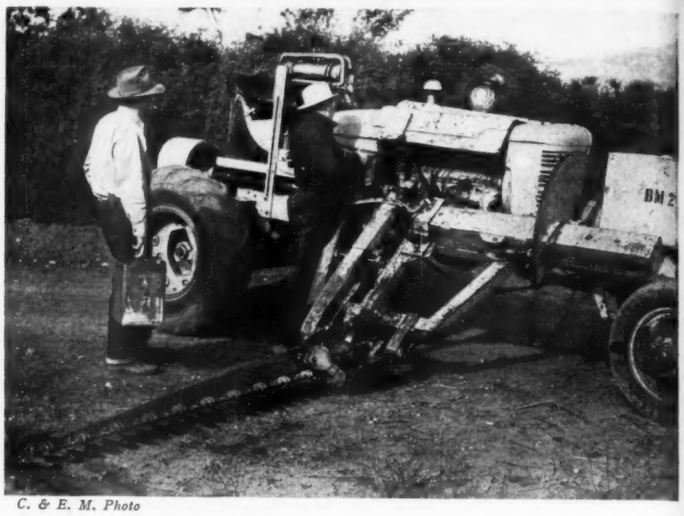

C. & E. M. Photo

Here is the heavy-duty brush mower the U. S. Forest Service has developed. The mowing blade is mounted on a grader frame.

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ing off as the crosshead vibrated and imparted a twisting motion. That one was solved by putting a guide piston and cylinder between the driving crosshead and the sickle bar. It serves to hold the driving force in a true plane. The inside of the cylinder is lined with bronze, and a pressure-lubricating tank supplies oil.

Most of the early trouble consisted of breakage of shafts that were too light. Substitution of larger-diameter members cured these troubles.

The grader on which the mowing blade is mounted has four forward speeds and a 6-mph travel gear, plus two back-up gears. Brushing is generally done in second, third, or fourth gears. The work varies a great deal, depending on the roadside slopes, density of brush, and so on. From an operator's point of view, efficient mowing consists of removing the brush as close to the ground as possible without allowing the sickle blade to dig into dirt or rocks. The installation of long steel rock guards below the sickle blades has done much to reduce blade damage from that cause.

When the machine was first perfected, it brushed about 175 miles in Mendocino National Forest, near Willows, Calif. The roadsides there were generally in good condition, and the machine averaged 2 miles a day for 2 months. In the Angeles National Forest the roadsides are rough, and the brush is worse. Manzanita, greasewood, mahogany, and many small trees crowd into the narrow 9-foot forest roads, which are used for fire prevention and forest administration.

Angeles National Forest includes the northern part of Los Angeles County, which even today is still largely a primitive area. During the 1930's the Forest Service and CCC built about 800 miles of 9-foot access road through the area, and lookout towers which are manned during the fire season were installed.

C. & E. M. Photo

Roadsides are rough and brush is worse than rough in the Angeles National Forest. But the Forest Service mower can handle it.

William V. Mendenhall, Forest Supervisor, is in charge of Angeles National Forest, and George Reynolds is his Forest Engineer. The mower is working as a part of the construction and maintenance operation, which is under the field supervision of P. B. Keef.

New Thread Compound

A new metallic compound said to prevent seizure of pipe, bolt and stud threads, and gasket faces has been developed by Armite Laboratories, 6621 Broad St., Los Angeles 1, Calif. Led-Plate anti-seize compound will achieve effective results when used in temperatures from minus 350 to plus 2,900 degrees F, the manufacturer claims.

The metallic elements, of which over 70 per cent is powdered lead, are held in suspension in hydrocarbons. According to the manufacturer, the materials will not dry out. This feature insures later disassembly against seizure. No graphite is used. The compound can be used for steam, gas, water, air, oil, ammonia, and various chemical connections, the manufacturer reports.

Further information on this thread compound may be secured from the company. Or use the Request Card at page 16. Circle No. 944.

High-Pressure Grease

Literature describing Molykote Type G, a grease compound containing Molykote Type Z powder with high-grade lubricating oil and a stabilizer, is available from The Alpha Corp., Greenwich, Conn. The product, it is claimed, prevents metal-to-metal contact, and thereby counteracts galling and seizing at extreme bearing pressures. The company explains that while there are many instances where the dry-film application is preferable, a grease film stores more Molykote powder, adds protection against corrosion, serves better to transfer or spread frictional heat, and is easier to apply.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 928.

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DARAKOTE adds working days to each paving season. Asphalt maintenance schedules continue on schedule. Blading and mixing of road mixes is faster, less time is required to aerate and dry out windrows and stockpiles. ***DARAKOTE*** cuts down demurrage and standby time, eliminates costly delays.

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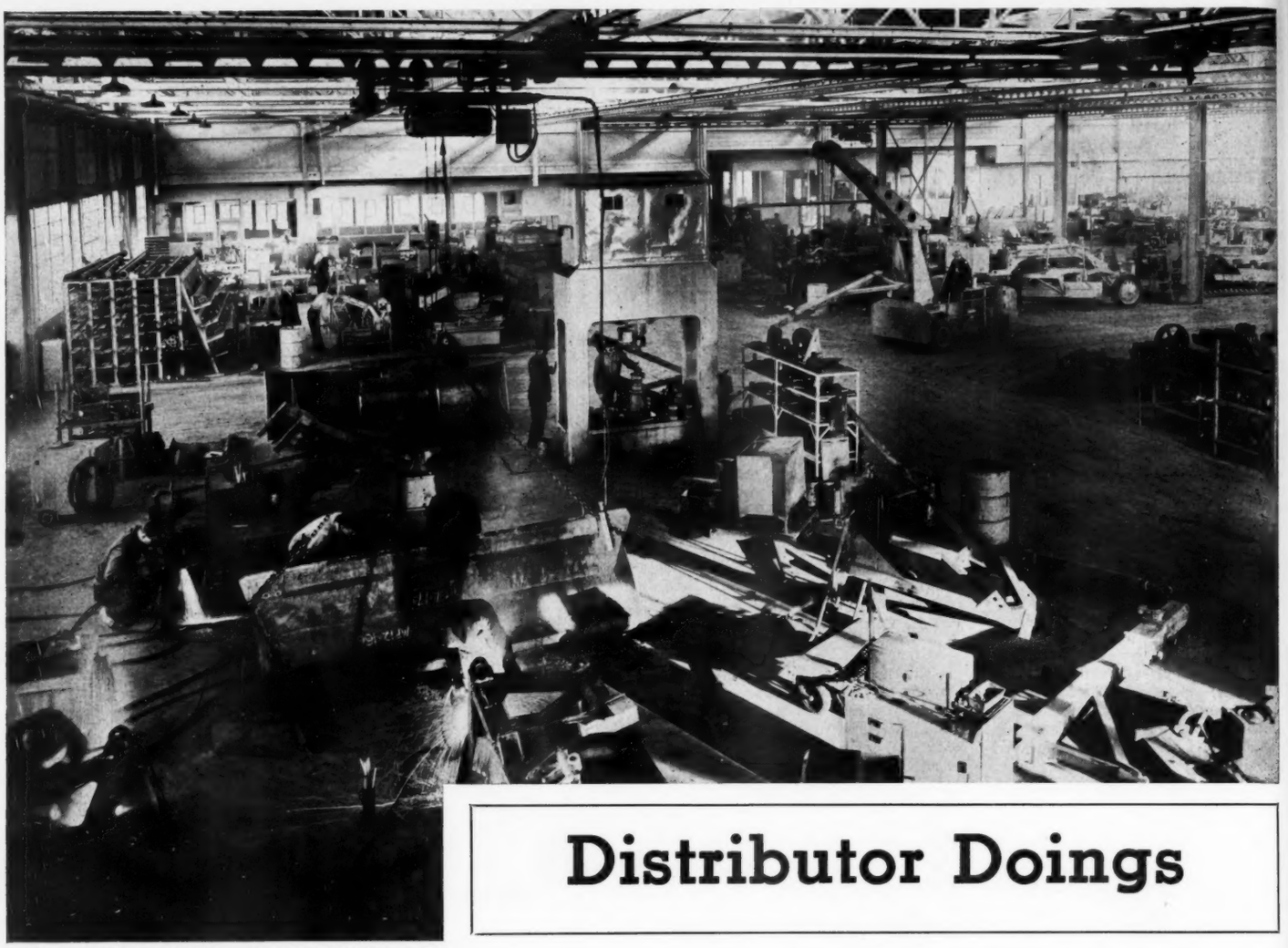
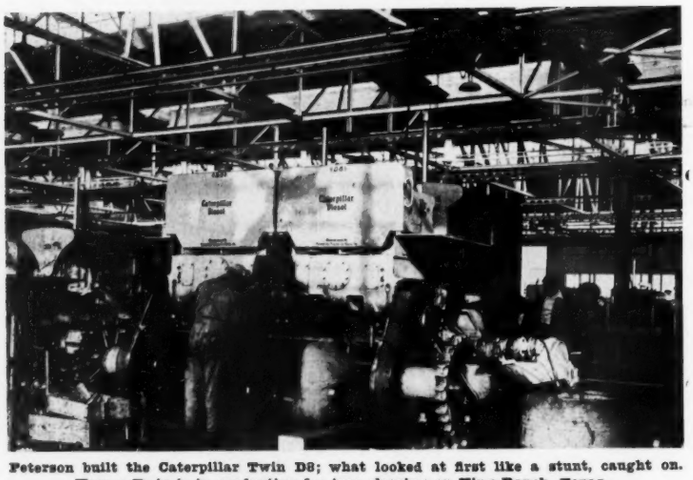


Here's a general view of the west bay of Peterson's new shop at San Leandro, Calif. Notice the hydraulic press in the center, which the company built to its own design.

Distributor Doings



Peterson built the Caterpillar Twin D8; what looked at first like a stunt, caught on. Here a Twin is in production for tree clearing on King Ranch, Texas.

Distributor Who Doubled the D8 Knows How to Double Customers Too

By RAYMOND P. DAY,
Western Editor

• IN San Leandro, Calif., a pickup truck ducked into a delivery stall at Peterson Tractor & Equipment Co. The driver hurried inside and plunked down a sizable parts order for contractor's equipment that was down. Ten minutes later his name was announced over the loud-speaker. His order was already filled and loaded into his truck.

As the dumbfounded driver absorbed the full meaning of that speed he muttered, "You don't even give a guy time for a cup of coffee, do you?"

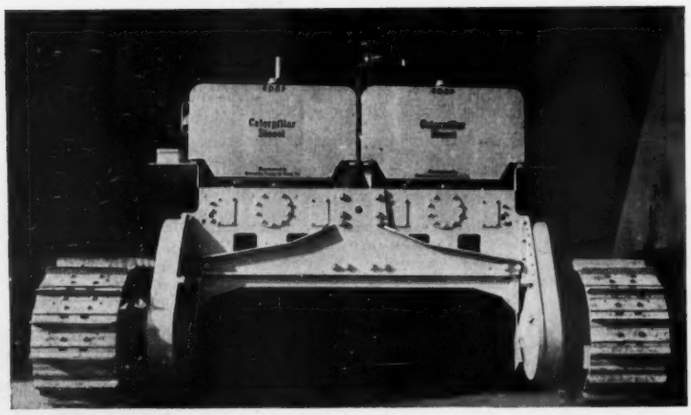
What that driver didn't know was that a record was already made of the whole transaction. Inventory cards had already been adjusted to show the outgoing parts. If this order ran the company short of anything, it was already marked up on the rush-order board.

That example of routine speed and efficiency at Peterson Tractor & Equipment Co. is one of the mildest ways to show how a most unusual equipment distributor operates. The outfit is spectacular in more than one respect. A large manufacturing company has purchased patent rights to machinery Peterson pioneered. Contractors depend on the vast store of mechanical know-how available to them at San Leandro. Consider these accomplishments:

They took two D8's and joined them to form a Twin D8, a supertractor. Now they're building a special Twin

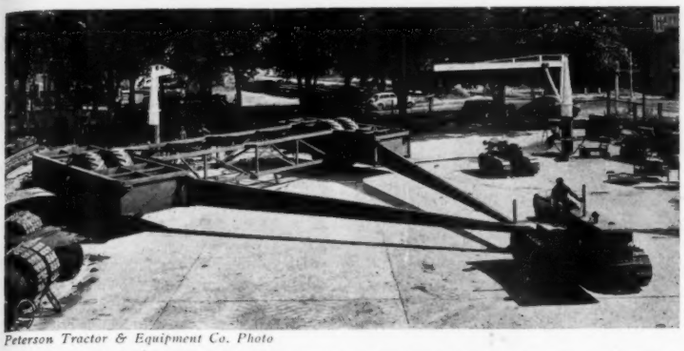
(*Continued on next page*)

C. & E. M. and Peterson Tractor & Equipment Co. Photos



The newest Twin D8 will carry a huge, high push bar to topple trees. Its funnel-shaped dozer, 18 feet across, is open in the center to pass brush back under the unit.

Two of the Twin's designers talk it over—Vice President Buster Peterson, left, and Consulting Engineer Kenneth F. Park.



Peterson Tractor & Equipment Co. Photo

More of Peterson's equipment—a testing device to simulate plane stresses on airports.

D8 with 3 feet of clearance under the machine to bowl over mesquite trees on the King Ranch in Texas. They designed a U-shaped dozer blade for Caterpillar tractors which was so successful that it is now offered as a standard product.

They analyzed Peter Kiewit Sons' Co. bank-sloping problems on the Friant-Kern Canal and came up with an answer: the Peterson Controlled Back Sloper. They made the first dozer blades for the DW10's . . . and again the parent manufacturing company is interested in producing the improvement.

Peterson Tractor & Equipment Co. Photo

This spectacular shot shows one of the first U-shaped dozers Peterson made for Caterpillar tractors. The blade is now offered as a standard product.

They boosted the lifting capacity of side booms on D8's from 27 to 41 tons for a pipeline contractor by extending the tracks, frame, and axles on one side of the tractor. That idea was sufficiently sound to induce similar modifications which are now being manufactured as standard products, according to Peterson officials. When Caterpillar companion scrapers to the DW10 got scarce, they rebuilt LeTourneaus, Wooldridges, and LaPlant-Choates to work at maximum efficiency with Caterpillar's rubber-tired tractors.

The entire space of this article could be used telling about numerous other mechanical innovations the Peterson people have pioneered . . . like the first dozer blades on tanks in the last war, or the air-controlled cable-control unit they invented. The office walls at headquarters are covered with the pictures of many such machines.

Strange to say, Peterson Tractor & Equipment Co. does not rate itself as a manufacturing concern. Its reason for being is to supply Caterpillar and allied equipment to contractors within a 5-county zone in the San Francisco-Oakland Bay area. But the company has in key positions many of the old-time dirt stiffs who, in the early 1930's, helped to develop and pioneer the major tractor and scraper improvements then made in California.

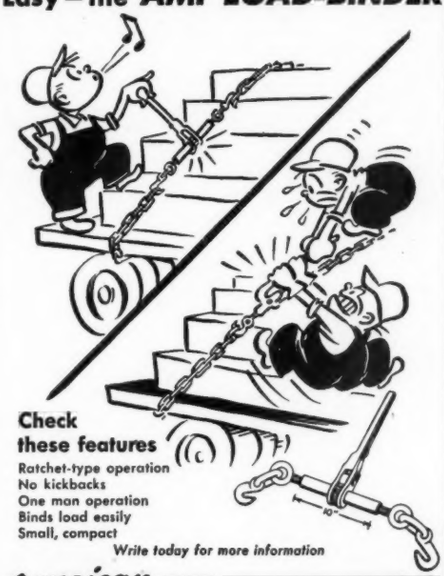
These key men are, many of them, nationally known. President Howard Peterson, Vice President R. A. "Buster" Peterson, Vice President Clint Price, Consulting Engineer Kenneth F. Park: these men head up the organization. Others of that early era include Elmer Miller, Joe Salvador, and Chief Design Engineer Fred Stevens.

"We're all still interested in lower-cost ways to do construction work," Buster Peterson explained. "So when a customer has special problems that call for special equipment, we try to give it to him by adding to or taking from standard machines."

Sandwiched in Peterson's current busy schedule, for example, is an asparagus cutter. Bay-area farmers needed something that would destroy extensive asparagus root systems, so

(*Continued on next page*)

It's Half the Work and Twice As Easy—the *AMF LOAD-BINDER*



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Distributor Doings

(Continued from preceding page)

Peterson got to work on a super-rotary-tiller device, powered by a D8 tractor as it operates, that will stand up under hard work.

Firm Has Mushroomed

Twice since the Petersons started in the equipment-distribution business in 1938, the outfit has outgrown its headquarters. Several years ago, with those lessons from experience in mind, the Petersons built a new layout. It is the last word in modern design. It is on a big 850 x 1,000-foot tract of land at 955 First Avenue. Every building has been designed with plenty of clearance and maneuvering room.

Unlike many equipment firms, this one separates shop customers, parts customers, and main-office callers. From the main parking area near the shop, customers can go either way to the shop or the main office, whichever their business demands. Customers for parts can drive direct to a loading stall at the main loading dock, place their orders at a main desk inside the display floor, and wait a few minutes until the parts are delivered.

The big buildings have ample room. The main office building houses administration activities, and it also is the nerve center to coordinate the activities of about 150 employees. The Kardex file system where a flexible inventory of parts is recorded is in this building. There are over 24,000 parts listed for Caterpillar equipment alone. And the parts department is also in this building. So is an agricultural department, where John Deere and other equipment is received.

A railroad spur with room for 6 cars serves the main building. There is a broad 60-foot concrete apron between the railroad spur and the first building. It gives some maneuvering room when equipment has to be loaded or unloaded.

The main repair shop is designed so that it can be enlarged if necessary. It has two 100-foot clear spans, with heavy open roof trusses which carry four lanes with seven traveling cranes on their rails. One half of the shop is devoted mostly to the redesign and alteration of equipment. The other half is a main repair floor where every kind of mechanical repair is made on Caterpillar and other equipment.

Outside this building, there is a smaller structure which houses a paint room, steam-cleaning equipment, and other activities. There is a separate unit for heavy sandblasting and major steam cleaning. Loading ramps built into the concrete apron make it easy for trucks to deliver heavy machinery. The firm has had Government contracts to overhaul as many as 100 pieces of heavy equipment per contract. The delivery ramps, as well as the general layout to boost efficiency, all help to get these jobs out in record time. Peterson's customers are contractors, the Government and State, and local farmers. All must be satisfied or the firm isn't happy.

Cost-Cutting Methods

Peterson's customers get the benefit of a host of cost-cutting methods which rival in ingenuity the inventions of the firm's principals. Take the first example in this article, of speed. One of the secrets of filling a parts order is the system of communication. Vacuum tubes connect every department in every building, and there is a nerve center in the administration building where the messages are sorted. It saves people from walking around between buildings or waiting for parts.

When the truck driver places his order, a vacuum tube whisks it to the control department. There it is quickly sorted and sent by vacuum tube to the parts department, as soon as the parts are subtracted from inventory. Partsroom people deliver the order to the driver's truck, announce the filling of the order over the speaker system, and amaze the driver with their speed. It is routine.

Suppose a mechanic tears down a D8 scheduled for major overhaul. Does he waste time making his parts order and getting it delivered? He does not. He walks into the main shop office, where all parts are catalogued. A trained man, skilled in Caterpillar parts numbers and terminology, helps him make that order. Then this liaison man vacuum-tubes the order to the parts department and works through the interoffice telephone until the parts are delivered. The firm practices the same speed for its shop men as for its customers, so time isn't lost.

Every conceivable type of special tool that makes service faster and easier has been built. There are motor stands, a jig and press for positioning cylinder heads, a special track on rollers for assembling tractor tracks, and final-drive pullers which save much hand work. They couldn't find a standard 125-ton hydraulic press to their liking, so they built their own. It is so heavy and rigid that they can put on the full 125-ton load in perfect safety. The big press has a 6-foot clear throat at the bottom, so it can easily be imagined what would happen if something slipped and a 1,000-pound piece of metal whistled across the shop like a rifle shot.

Peterson Tractor & Equipment Co. Photo

This ripper was made for a D6.

Portable storage stands are used where necessary to keep large parts off the floor, thus also conserving space. The stands are sturdily built. They have pipe legs, and several sections can be telescoped together. Peterson men let nothing touch the floor that doesn't belong there. They stack heavy power-control units four-high in these stands, and handle all or any part of the four with front-end high-lifts.

Good housekeeping has reached a high point just outside the buildings. A 2-foot strip outside each building has

(Continued on next page)

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Distributor Doings

(Continued from preceding page)

been landscaped beautifully with shrubs and flowers. Buster Peterson grins as he explains, "Mechanics are often inclined to be careless in disposing of refuse, but nobody will quite like to throw an empty oil can or other waste in a flower bed."

Every piece of equipment that comes in for a major overhaul is steam-cleaned and sandblasted, and then repainted from scratch before it goes out again. Heavy-duty Malsbary steam cleaners and overhead hose supports shorten the labor time on this operation.

"We find that our mechanics like to work better on a clean tractor", said Buster Peterson. "When you send a clean, painted, repaired-like-new machine back out to work, the operators treat it like new, too."

For several years the company had its own plane to speed the delivery of small parts. It was sold recently, but the idea was so successful that another will soon be bought.

Customers who need specially altered machines can also be sure of another thing to their advantage. Every major change is thoroughly engineered. Plans are drawn in the drafting room, stresses are carefully analyzed, and there is a detailed record in print form available to the customer. Furthermore, standard parts generally form the modification.

Barring unforeseen developments in the parts situation, Peterson plans to stock its usual huge parts reservoir throughout the present emergency. Caterpillar parts in stock alone total about $500,000.

Customers benefit, too, from the big 200-man auditorium where service meetings are held. Skilled as the mechanical force is, the head men hold meetings and use every possible device to improve efficiency. There is a fully equipped kitchen near the auditorium for the preparation of coffee and sandwiches . . . also a lulu of a darkroom where Ken Park, a good man with a camera, develops pictures. Park is also the Advertising Manager for the company. "I go in that office when there's no mud on my boots", he explains with a smile.

Rebuilt Jobs Gain Notoriety

Regardless of how complete the distribution setup is, and regardless of the major place distribution occupies in the firm's affairs, the mechanical rebuilding jobs have gained many new friends and most of the publicity for the company. When the Twin D8 was first designed and built, after Buster Peterson, Park, and Design Engineer Stevens had mulled the idea over for a long time, a few people looked on the whole thing as a kind of stunt. They don't any more.

They have sold the Twin D8 with a 20-foot blade as a dozer. They have used one at Hungry Horse Dam on very heavy clearing. One of the machines, with a huge built-up blade, is piling coal in Ohio. Another has been purchased by a contracting firm in Pittsburgh. They have used it successfully and economically loading scrapers, pulling larger batteries of sheepsfoot rollers, and grubbing roots. One of the country's great construction groups, using the Twin D8 ahead of Euclid BV-type loaders, has found it highly successful.

Right now, a new Twin D8 is being built that will be a monstrous thing. There is 36 inches of clearance from the ground. It will carry a huge, high push bar to topple trees. Its funnel-shaped dozer blade, 18 feet across, will be open in the center so brush can pass back under the machine. There will be a huge drawknife behind the tractor, pulling through the ground, to cut all roots. The acreage which this roaring behemoth will clear in a day will be enormous.

When the company began adapting several makes of scrapers to DW10 tractors for its customers, it didn't know what the Caterpillar reaction would be, in spite of the scarcity of Caterpillar scrapers. Obviously the reaction wasn't too severe, because the remanufacturing stunt caused Peterson Tractor & Equipment Co. to account for a substantial part of the total number of DW models manufactured for the whole nation that year!

Several big national contracting outfits swear by Peterson's mechanical geniuses. Buster Peterson is still a young man, but several people in the equipment and construction business say that more concentrated experience has already been crowded into his life than most retired men are fortunate enough to have had.

A Look 50 Years From Now

As crowded as their hours are, Peterson's key men still find time to dream.

(Continued on next page)

LINDSAY MODEL T-33 AIR COMPRESSOR

This moderately priced, really portable air compressor has adequate capacity to operate a light paving breaker or rotating rock drill. Contractors, municipalities and water departments find the Lindsay Model 33 well suited to their needs. Write for prices and specifications.

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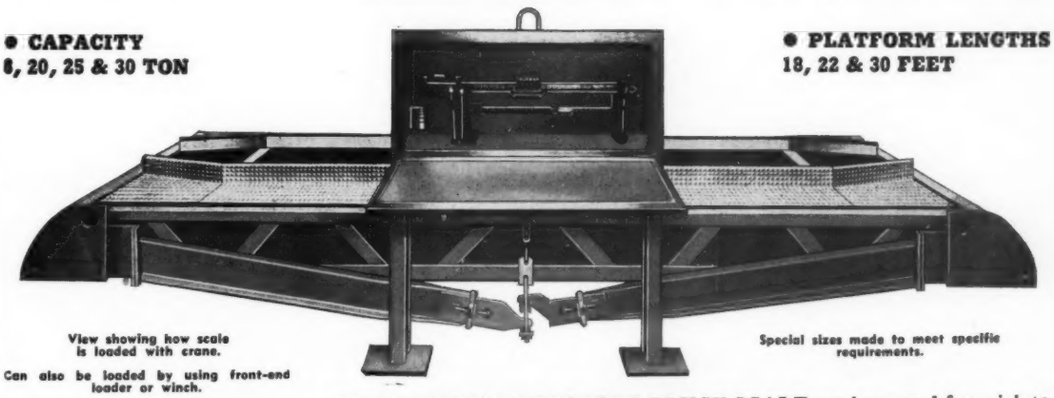
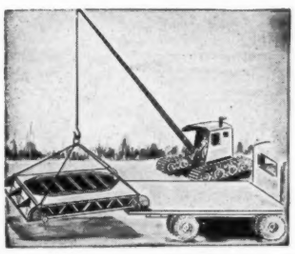


View showing how scale is loaded with crane.

Can also be loaded by using front-end loader or winch.

Special sizes made to meet specific requirements.



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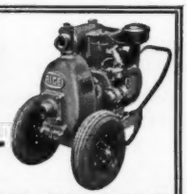

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Distributor Doings

(Continued from preceding page)

Peterson and Ken Park, under prodding, were willing to stick their necks out. What kind of super earth-moving equipment will we have 50 years from now? Will we have vehicles with individual-wheel drive? Or maybe a type that uses an atomic plant, or takes power from a central station over some type of aerial?

Both men looked anything but surprised. As they see it, one of the keys to future earth-moving efficiency is a way to hold the dirt suspended, independent of the ground. They contemplate the heavy loads helicopters now pick up and fly away with. They dream about some kind of compact, but as yet not dreamt of, power package that will allow the earth-moving machine of the future to fly in over the borrow pit, light or hover as it scoops up its load with power to spare, and fly away to the disposal ground. Maybe it won't be a helicopter, but it will have its principle, they believe.

Regardless of what futuristic form the machine of a half-century hence takes, it's a fairly safe bet that these men will be thinking about it ahead of everybody else. And in between, they'll be busy with more prosaic, routine work . . . boosting machinery sales, giving better service, or enlarging the place when that becomes necessary.

Dealers—Distributor Doings is your Department. Send in your news.

300 Attend Herd Service School

Approximately 300 commissioners, operators, mechanics, and foremen attended a service school sponsored by the Herd Equipment Co., Oklahoma City, Okla., on March 9-10. This year's session broke previous attendance records and was, Herd reports, more successful than any which it has sponsored in the past.

Manufacturers' representatives who made the school possible are: John Gates, Galion Iron Works, Galion, Ohio; Ralph Nelson and Roy Cherry, J. I. Case Co., Racine, Wis.; Claude Vorpahl and Jack Sullivan, Chain Belt Co., Milwaukee, Wis.; George Ostertag and George Schmidt, Four Wheel Drive Auto Co., Clintonville, Wis.; Don Doerschlag, Russ Kilpatrick, and "Smokey" Nelson, International Harvester Co., Chicago, Ill.; and Bob Heckenkamp, Gardner-Denver Co., Quincy, Ill.

Euclid Dealers, Canada, Maine

Euclid Road Machinery Co., Cleveland, Ohio, has added two dealers to its list. Dietrich-Collins Equipment Ltd., 890 S. W. Marine Drive, Vancouver, is handling the complete line of Euclid equipment in the Canadian provinces of British Columbia and Yukon on an exclusive distributorship basis. The dealer company carries parts stocks for all its equipment lines and maintains shop facilities for overhaul and repair. In addition to the Euclid line the company handles Lima, Galion, Michigan Power Shovel, Worthington, Lippmann, Hercules and other equipment.

Fred H. Dietrich is President and Managing Director; James B. Collins is Vice President and Secretary. W. P. Webb is General Manager; L. R. Van Kleeck is General Sales Manager; and J. P. Enemark is Service Manager. The company has a service branch at Nanaimo, B. C.

The new distributor for the state of Maine, N. A. Burkitt, Inc., in Scarboro, handles Euclid off-the-highway hauling equipment, loaders, and scrapers.

(Continued on next page)

How ADJUSTOMATIC SCAFFOLDING SAVE 50% IN TIME, LABOR, EQUIPMENT COSTS...

"Built for Any Job"

Adjustomatic Scaffolding is adaptable to any type job. Exterior or interior—stationary or rolling platforms. For sale or rent by dealers in all major cities—or write for full information.

Positive locking device. No bolts, nuts, pins, etc. Just flip the lock!

Lock cannot tie up from use, rust, mortar. Instant locking action throughout entire life of scaffolding.

NO LOOSE PARTS—Only two basic parts, end frames and braces. No parts to lose or drop.

SAFER—Platform guards are built-in, planks cannot slip over sides. Ladders inbuilt, too—nothing to drop. Larger, 1.75" O.D. steel tubing. Milled, electrically welded joints.

FASTER ERECTION—Goes up and down twice as fast. No skill required. Just slip on braces, flip the patented lock!

STRONGER—Each frame will carry 30,000 pounds. Approved by Safety Codes. Used on many of the country's largest scaffolding jobs.

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You can contribute to this might by seeing to it that *all* idle scrap in your possession gets back to the mills—where it can produce tools, machines . . . as well as tanks, guns and shells to protect our future security.

Steel is the backbone of production. By "getting in the scrap" *now* to make steel, *you* can add to America's strength.

LACLEDE Producers of Steel for Industry and Construction
LACLEDE STEEL COMPANY St. Louis, Mo.

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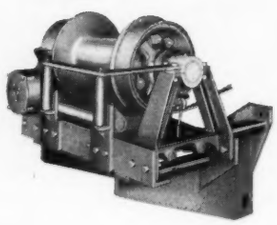

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Distributor Doings

(*Continued from preceding page*)

This company, of which N. A. Burkitt is President, also represents Pioneer Engineering Works, Worthington Pump & Machinery Corp., and Marion Power Shovel Co. Otis Graham and Ralph Stevens constitute Burkitt's field sales staff.

Announcing "Machinery, Inc."

Machinery, Inc., a new company which will specialize in the sale, service, and rental of heavy-construction equipment and supplies, is open for business at 919 Virginia St., E., Charleston, W. Va.

O. W. Robinson is President of the new company. He is also associated with the West Virginia Mine Supply Co., Clarksburg, W. Va. W. T. Coleman, Vice President and General Manager, was formerly with Baldwin Machinery Co., Charleston, W. Va. And C. K. Payne, Secretary and Treasurer, owns Engine Sales & Service Co., Inc., Charleston.

Two Huber Dealers in East

D. M. Brendle, former Eastern District Sales Manager for Huber Mfg. Co., Marion, Ohio, resigned on March 1 to go in business for himself as a Huber distributor in eastern Pennsylvania. With headquarters in Ephrata, Pa., Mr. Brindle's territory includes the counties of Berks, Lehigh, and Northampton.

The E. W. Systrom Co., 15 N. Beacon St., Watertown, Conn., is handling the complete line of Huber road equipment in Rhode Island and Massachusetts. E. W. Systrom founded the company in 1931. Today he heads a 7-man team which includes John McGlew, Sales Manager; William Earle, Ralph Sanesi, and Frank McManus, district sales managers; Larry Martin, Parts and Service Manager; and two service men.

Everett Handles Lodover

Clyde Everett Equipment Co., 296 Binney St., Cambridge, Mass., is an exclusive distributor for the Lodover, a combination overhead and front-end shovel for International Harvester tractors, made by Service Supply Corp., Philadelphia.

LeTourneau distributor personnel from England, Belgium, Norway, Austria, and France attend the first session, in Staines, England, of a series of thirteen export service training schools.

LeTourneau Men to Tour Globe, Conduct Dealer Training Schools

R. L. Wollberg, educational program manager for R. G. LeTourneau Inc., and Max Loertscher, service engineer and instructor, left Peoria on February 19 for a 30,000-mile trip which will take them to Staines, England; Casablanca, French Morocco; Karachi, Pakistan; Bombay and Calcutta, India; Bangkok, Siam; Johannesburg, Union of South Africa; Elizabethville, Belgian Congo; Sao Paulo, Brazil; Santiago, Chile; Caracas, Venezuela; and Mexico City, Mexico. They will bring the latest information on maintenance and repair of LeTourneau equipment to the company's export distributors and their customers.

During the trip, Mr. Wollberg and Mr. Loertscher will conduct 13 two-week schools, giving instruction on the Tournadozer, all models of Tournapulls, and attachments and trailing units for both types of machine. The first week in each school will be devoted to electrical theory, repair, maintenance and "trouble shooting"; during the second week, mechanical problems will be taken up. Instruction will be supplemented by training aids—movies, detail charts and diagrams, photographs, and actual parts and assemblies. Special certificates will be issued to men who show themselves particularly skilled and efficient in maintenance.

Schlothauer With Burgess

Lee M. Schlothauer is assisting Fred H. Burgess, 2337 Papin St., St. Louis, Mo., in the coverage of the metropolitan St. Louis area, the eastern half of Missouri, and the southern half of Illinois. Mr. Burgess is distributor for Superior Concrete Accessories, Inc., and Heckman Building Products Co., both of Chicago. He also has a special engineering service for concrete-form construction. Mr. Schlothauer was previously with the Geo. F. Smith Co.

Three Additions to Heil List

M & L Motor Supply Co., Mason City, Iowa, and Sidles Co., Omaha, Nebr., are handling bodies and hoists made by The Heil Co., Milwaukee. Southern Ohio Equipment Co., Inc., Zanesville, Ohio, is representing Heil in the sale and service of road machinery.

M & L was founded in 1935 as Central Auto Electric Co. It was purchased last year by Sylvan J. Mack and Tim Lipschultz, President and Vice President respectively. Sidles Co. was founded in 1903. It has 4 branches in Iowa, 11 in Nebraska, and 4 subsidiary companies in related fields. Charles L. Carper is Chairman of the Executive Committee and Treasurer; Harry B. Sidles is President; Victor L. Taft is Executive Vice President and Secre-

(*Continued on next page*)

FLEET OWNERSHIP SPEAKS FOR ITSELF

THE EAGLE TRUCK-MOUNTED LOADER

Makes fast work of loading any loose material—dirt, cinders, snow, etc. Gets from job to job at truck speed. One man operated! Their record of economical performance leads to fleet purchase. Send for Form 947.

EAGLE CRUSHER CO., Inc. GALION OHIO·U·S·A

JAW CRUSHERS · IMPACT BREAKERS PULVERIZERS · CONVEYORS · LOADERS

Cut Costs! with ONAN portable ELECTRIC PLANTS

MODEL 3CK 3,000 watts A.C. 5,000 watts D.C. with carrying frame or dolly-mounted

Take 'em Anywhere!

Increase your profits by using fast-working, cost-cutting electric tools on every job, even where highline power is not available. Lightweight, sturdy, Onan engine-driven electric plants supply instantly-available power *anywhere* for lights, drills, saws, pipe-threaders, planers, spades, tampers, repair-shop tools and other motor-driven equipment. Carry 'em, wheel 'em, or truck 'em right to the spot and plug in for all the power you need. Equipped with carrying handles or dolly-mounted.

Lightweight Air-Cooled Models: A.C.—400 to 3,000 watts. D.C.—750 to 5,000 watts. Heavy-duty models to 35,000 watts.

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D. W. ONAN & SONS, INC.
7469 University Ave. S.E., Minneapolis, Minnesota

SAVE UP TO $586 PER MILE* ON SOIL-CEMENT CONTRACTS!

*Based on 20 ft. road width.

A TWO-MAN TEAM —plus the Hercules Cement Spreader—makes up complete spreading crew; saves from 2c to 5c per square yard in time, labor, and materials. Couples to any conventional dump truck.

Hercules

MAIL COUPON for complete facts about this revolutionary spreader!

HERCULES STEEL PRODUCTS CORP., Dept. 505, Galion, Ohio

Please send me facts about the Hercules Cement Spreader.

Name_____

Address_____

City_____ State_____

Distributor Doings

(Continued from preceding page)

tary; and Fred S. Sidles is Vice President and Chairman of the Board.

J. Russell MacSword founded Southern Ohio Equipment in 1931. This firm, with MacSword still at its head, represents about 50 manufacturers.

Harry E. Green of Metalweld Dies

Harry E. Green, Sales Engineer with the Construction Equipment Division of Metalweld, Inc., died recently in Philadelphia.

Marion Outlet in Mexico

Ingenieria Mecanica y Electrica S. A. now distributes throughout Mexico the excavating and material-handling equipment made by Marion Power Shovel Co. Gregorio Morales Garza, Juan Francisco Fournier, and Luis E. Lomas are partners in the distributor firm, whose offices are at Roma 35, Esq. Viena, Mexico City.

Applies One Rule for Success

"Handle quality products with a proved record of profit-making operation and provide top-flight after-sale service." The application of this rule has won a top place among the state's machinery distributors for Louisiana Industrial Equipment Co., 2346 N. Foster Drive, Baton Rouge, La. This relatively new firm now handles the products of ten well known manufacturers, and its emphasis on service and replacement parts has made for reliable field performance and for customer satisfaction.

The company's plant, which is on a 100 x 300-foot lot, includes an office building, a steel repair shop, and a parts building. The lot gives access to the Illinois Central railroad.

Offices and shops of the Louisiana Industrial Equipment Co. are on Foster Drive in Baton Rouge. The officials shown in conference are, left to right, President O. W. McFarland, Office Manager Ruth Dwight, and Sales Manager Joe F. Reeder.

O. W. McFarland is President of the Baton Rouge firm and Joe F. Reeder is Sales Manager. Arthur Holland manages the Service Division and J. B. Colomb has charge of parts. John B. Blanchard and A. L. Hollanshead are sales representatives. Ruth Dwight is Office Manager.

Nordberg Appoints Yaun

Yaun Equipment Co., 2120 N. Third St., Baton Rouge, La., is distributing 4FS diesel engines made by Nordberg Mfg. Co. of Milwaukee, in the southern half of Louisiana.

Yaun was established in 1921 by J. F. Yaun, who began manufacture of an all-welded steel dragline bucket. J. Clifton Yaun is now President; Huey F. Yaun, First Vice President; J. D. Ganey, Secretary-Treasurer; and J. H. Loupe, Sales Manager.

Coast Equipment Sales-Staff News

The Coast Equipment Co., San Francisco, has added Jack Fingland and Frank N. Dyer to its sales force. Mr. Fingland is working with the Bay Area field sales staff; Mr. Dyer has joined the San Francisco office sales staff.

Riddell Adds Three Dealers

The W. A. Riddell Corp., Bucyrus, Ohio, has added Baldwin Machinery Co., Inc., Charleston, W. Va.; A. T. Green Machinery Co., Glenshaw, Pittsburgh, Pa.; and Gill Equipment Co., Atlanta, Ga., to the list of dealers handling Warco motor graders and Hercules road rollers. The three new dealers have complete sales and service facilities.

Three Cleco Dealers Appointed

The Cleco Division of the Reed Roller Bit Co., Houston, Texas, has added three dealers to its list. The companies, which will distribute Cleco pneumatic tools in their respective territories, are the Olson Equipment Co., 2930 Blaisdell Ave., Minneapolis, Minn.; the Gil Boers Equipment Co., 7625 S. Kedzie Ave., Chicago, Ill.; and Airline Equipment Co., 2024 Frankford Ave., Philadelphia, Pa. They will handle the full line of Cleco and Dallett pneumatic tools and accessories.

Sheppard Has Rosco Line

Sheppard Equipment Co., Inc., Lexington, Ky., is the exclusive distributor in Kentucky for the road construction and maintenance machinery made by Rosco Mfg. Co., Minneapolis. Other manufacturers whom Sheppard repre-

(Concluded on next page)

Finian's

Folly *or (How to Make a Monkey Out of Rising Costs!)*

• • •

Imagine Finian . . . dreaming of reduced overhead by doing away with his organ grinder friend!

Like any good businessman, Finian should have known you can't reduce overhead by eliminating productive labor . . . but you do reduce overhead by making labor more productive.

For years the makers of Warsop Power Tools have been reducing overhead for smart businessmen all over the world by producing rugged, dependable portable rock drills and paving breakers that do more work . . . faster. Yes, the work done by a Warsop Portable Drill or Breaker more than equals four additional men in your crew . . . and can be used on any job, large or small.

You too can make a monkey out of rising costs by aping the many satisfied users who are daily discovering that Warsop Portable Power Tools do more work, save time and money.

Don't delay . . . write today for descriptive literature and specifications.

Contractors, railroads, electric power and water companies, logging road constructors, mining and quarrying companies find Warsop Portable Rock Drills and Paving Breakers especially valuable in:
• Paving breaking • Tamping • Sheathing Driving • Ground rod and spike driving
• Trenching • Breaking frozen ground • Rock and concrete drilling

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a material handling giant . . . with SPEED

the New **FAIRFIELD** Power Moved Troughed Belt Conveyor

Model 639 with 10 H. P. electric motor—Models also available with air cooled gasoline engines.

When it comes to material handling—loading and stock piling — efficiency is a must. The jobs require speed. The answer to high volume tonnage is Fairfield's Model 639, the power moved Troughed Belt Conveyor. It offers simplified drive and control with such features as: hydraulically operated boom hoist, even-keep balance, 2 speeds forward and reverse—virtually every conveyor facility you need. Operation is simple and easy, controls are centralized at the operator's platform. And, they're built for years of rugged, heavy duty with practically no replacement cost. Here's the answer to extra-heavy loading and stock piling duty. Put this smooth operating, low cost conveyor to work in your operation. It's available in both 18" and 24" belt widths.

FAIRFIELD

For complete information on Fairfield conveyors for the construction field, write for your copy of bulletin 450.

The FAIRFIELD ENGINEERING COMPANY
348 Chicago Avenue • Marion, Ohio

Distributor Doings

(Continued from preceding page)

sents include LaPlant-Choate Mfg. Co., Baldwin-Lima-Hamilton Corp., Hercules Motors Corp., Lippmann Engineering Works, Davey Compressor Co., Gar-Bro Mfg. Co., and Minneapolis-Moline Co. W. E. Sheppard is President of the firm whose headquarters are at 525 Corral St., Midland, in Lexington.

Bacon Handles Surfa-Slick

Edward R. Bacon Co., whose main offices are at 17th and Folsom Sts., San Francisco, Calif., is distributing in northern California and western Nevada the Surfa-Slick self-heating asphalt-smoothing irons made by J. E. Woods Mfg. Co., San Fernando, Calif. The dealer company has branches in Sacramento, Oakland, Stockton, and Fresno.

Gear, Wheel Pullers

A complete line of rigid-arm and universal wheel pullers is manufactured by Armstrong-Bray Co., 5364-5378 Northwest Highway, Chicago 30, Ill. Steelgrip rigid-arm pullers are made in 2 and 3-arm types. Both are available in a number of sizes to pull gears and wheels up to 18 inches in diameter at distances up to 22 inches from the end of the shaft. The drop-forged heat-treated arms are interchangeable between the two types. Most sizes have additional holes for adjustment of reach. Also included in the line are many special pullers designed for specific operations in the maintenance of automotive and industrial engines.

Chaingrip universal pullers, the manufacturer reports, can pull wheels either close to, or at a considerable distance from, the end of the shaft. They have regular chain hooks on one end (for spoked pulleys, etc.) and special close-grip hooks on the other (for solid gears, sheaves, motor pulleys, pinions, bearings, etc.). The yoke which supports the heavy forcing screw has three chain slots that permit instant adjustment of chain length. Pull capacities in the various sizes range up to 12 tons.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 893.

One to Five-Ton Hoists

A new 6-page catalog descriptive of Bob-Cat heavy-duty electric cable hoists is announced by Ohio Hoist & Mfg. Co., Cleveland 5, Ohio. Printed in two colors, it is illustrated with photographs, line drawings of various types of suspensions, and a large cutaway view of the Bob-Cat hoist. It gives detailed specifications on 1 to 5-ton models and lists lifting capacities, heights, speeds, weights, overall dimensions, etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 945.

"We'll have to see about a new cable; this one's about shot."

Agenda Released for Fifth Pan American Road Congress

The agenda for the Fifth Pan American Highway Congress scheduled for October 8 through 14, 1951, at Lima, Peru, has been released by the Peruvian government. The five sections covered in the agenda are: (1) the techniques of highway engineering, planning, construction, and maintenance; (2) traffic; (3) legal, administrative, and economic problems connected with highways; (4) public relations and the education of highway engineers; and (5) international uniformity of signs, signals, and classifications.

A sixth section on "Inter-American cooperation in highway planning and construction during the emergency" has been recommended for inclusion in the agenda.

The Peruvian government is encouraging manufacturers to exhibit their equipment at the road show to be held in connection with the Congress.

The relocation of Highway 40 between Hancock and Cumberland, Md., calls for the removal of 1,000,000 cubic yards of earth and muck. Here a 19-year-old 1½-yard Osgood shovel powered by a General Motors diesel works through Sideling Hill Mountain. The contractor is M. J. Grove Lime Co. of Frederick, Md.

BRAND NEW **WAR SURPLUS** $3800.00 VALUE

BYRON-JACKSON "PUP"

CENTRIFUGAL PUMP UNIT

COMPLETE WITH FULL PUMP AND ENGINE INSTRUCTIONS

2 STAGE MODEL "PUP" PUMP DRIVEN BY AN 8 CYLINDER MODEL C-36 CHRYSLER INDUSTRIAL ENGINE

USE FOR:
- PICK-UP • GATHERING
- FIRE FIGHTING • IRRIGATION
- SALT WATER DISPOSAL • SPRINKLERS
- DEWATERING • CONSTRUCTION, ETC.

ENGINE SPEED 2400 RPM — 100 H.P.
600 GPM at 175 PSI — PARALLEL CONNECTION
300 GPM at 375 PSI — SERIES CONNECTION

These skid-mounted Pumping Units are standard production models with parts and service readily available. Designed for a wide range of operating conditions particularly where wide variation in head and capacity are required.

Twin suction and discharge ports are cast on the same side and so arranged that external piping is interchangeable for either series or parallel pumping applications.

Overall dimensions 114" long, 29" wide and 62" high. Weight 4060 lbs. Complete with operating instructions, priming equipment and performance data.

NOW ONLY **1495.00** F.O.B. CHICAGO (Item #132)

ORDER TODAY

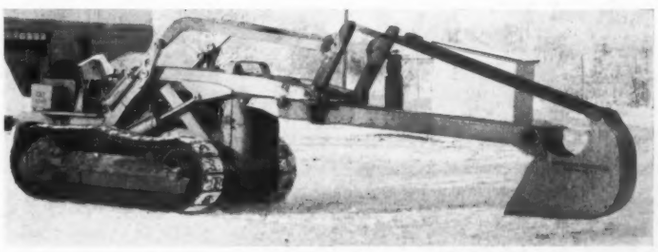
GROBAN SUPPLY CO. Dept. CE-5 1139 S. WABASH AVE. CHICAGO 5, ILL.

ACCESSORIES INCLUDED

HEAVY-DUTY TRENCHER

A heavy-duty trench digger, which is designed for a wide variety of trenching for any highlift tractor with hydraulic bucket control.

It will increase the tractor's production from 30 to 50 per cent, and is easily attached by one man in 15 minutes.



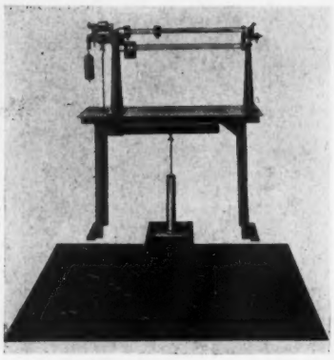
The Whitestown Trencher is now available for use on the following hydraulic controlled tractors:
- Allis-Chalmers HD-5G equipped with TS-5 Tractor-Shovel
- Caterpillar D-4 and Trackson HT-4
- International TD-6 & TD-9 equipped with new Bucyrus-Erie dozer-shovel.
- International TD-6, TD-9 & TD-14-A with Hough Bulldozer-shovel
- Hough Model HM-Payloader
- Oliver with 4-A Lull Loader

The Whitestown trencher is equipped with a ½-yard standard bucket. Special buckets, made to individual specifications, may be obtained. It will dig to a depth of 8 feet and dump at a height of 12 feet. This trencher has been in constant use for three years, and has proved to be rugged and satisfactory in every way.

Immediate delivery can be made.

WHITESTOWN TRENCHER CO., INC.

Wood Road, Whitesboro, New York — Phone: Utica 6-1117



The Load King platform beam scale is built in capacities up to 6,400 pounds.

Platform Beam Scale

A new platform beam scale has been announced by The Yale & Towne Philadelphia Division of The Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa. It is built in capacities up to 6,400 pounds and in self-contained and semi-selfcontained models. Platforms range from 46 x 38 to 76 x 54 inches.

The Load King is for heavy-duty applications where "shock-loading" is the rule. The lever system in the platform is all-steel, as are other key parts. Poises on the main bar are mounted on roller bearings for rapid positioning. Other features include a 100 per cent end loading platform which is said to give the correct reading regardless of where the load is on the platform. The platform is mounted on outboard bearings to absorb the shock of moving loads without damage to the scale. Pit requirement for the Load King is 11 inches.

Further information may be secured from the company. Or use the Request Card bound in at page 16. Circle No. 907.

Low-Hp Air-Cooled Engines

A specification sheet on the Series VS-700 engines, designed to deliver 1½ to 2 hp over an operating-speed range of 2,000 to 3,600 rpm, is available from the Engine Division of the Clinton Machine Co., Maquoketa, Iowa. It states that these units may be used to power chain saws, small compressors, concrete mixers and tampers, drill rigs, hoists, grinders, mowers, pumps, sprayers, vibrators, etc. Diagrams and specifications are provided.

This literature may be obtained from the company, or by using the Request Card bound in at page 16. Circle No. 886.

Heat 16 or More Tampers and Smoothers in 5 Minutes

ASPHALT PAVING TOOL HEATERS

This rugged combination heater, with 3 kerosene burners, for bituminous pavement construction and repair work, heats all the tools you need; also melts a kettle of binder cement in 10 minutes. Ample capacity; pneumatic tires—easy trailing.

Melt Tar • Asphalt Pitch and Bitumens Faster—with Less Fuel

MELTING KETTLE

With its improved well type oil burner and internal tube heating system, delivers "hot stuff" as you need it. 40 to 165 gal. capacity; also with hand or power bitumen spray attachments for road and street patching.

Also ask for catalogs on Hauck Surface Heaters, Compound Melting Furnaces, Thawing Equipment and Concrete Heaters.

HAUCK MFG. CO.
116-126 Tenth St., Brooklyn 15, N. Y.

These Kinds of Companies use the New Kind of Lubricant...

PLASTILUBE*
THE SUCCESSOR TO GREASE

GENERAL MOTORS, GENERAL ELECTRIC, BETHLEHEM STEEL, ALUMINUM CO., REPUBLIC STEEL... AND OVER 2000 OTHER FIRMS HAVE TESTED AND USE PLASTILUBE, THE AMAZING NON-MELTING, PROVEN MULTI-PURPOSE LUBRICANT, "THE SUCCESSOR TO GREASE." IF YOU HAVEN'T TRIED PLASTILUBE, YOU'RE MISSING A BET... TO TRY IT, SIMPLY MAIL THE COUPON BELOW.

THE Warren REFINING & CHEMICAL COMPANY
CLEVELAND 15, OHIO

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CLEVELAND 15, OHIO
Rush my sample of PLASTILUBE

*REG. U.S. PAT. OFFICE

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CRITICAL MATERIAL

BRAND NEW PORTABLE MULTI-USE POWER SAW
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America's greatest saw bargain! Cuts lumber to 4" thick. Briggs & Stratton 3½ H.P. gas engine. Saw cuts flue lining, TRANSITE pipes, steel sheets, copper & aluminum, etc. Does work of $1,000 worth of saw equipment. Sharpens tools. Famous make, brand new, original crates. Limited supply. Send for literature.

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PLASTIC PIPE AVAILABLE
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It is easy to handle, lay, and retrieve. We have it in sizes up to 6" in diameter. The small sizes are flexible while sizes 3" and up are semi-rigid.

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FOR SALE
ESCO 2-Yd. Orange Peel Rock Bucket
Purchased new August 1950 Condition: Perfect
9 End Dump Euclid Trucks & 2 Bottom Dump Euclid Trucks

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UNUSED SHOVEL-DIPPERS
Amsco—1-¾ Cu. Yd. 855 P&H $1,000.
Amsco—½ Cu. Yd. 275.
Pettibone-Mulliken ¾ Cu. Yd. Bottom
Base #A-793-B Qty. 11 @ $850. Each 95.

ABCO
Granite City, Illinois

Wanted . . .
DEALERS and DISTRIBUTORS

Large, well-known manufacturer of Diesel engines wants distributors and dealers to handle proved line of small Diesels for generating electricity, pumping, and for straight power applications. Exclusive territories are open to active organizations with broad contacts. Please advise accounts being handled, length of time in business and pertinent information on general background of organization. Write:—

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Contractors & Engineers Monthly
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FOR SALE
Euclid rear dump rock trucks, 15-ton (East—6).
LaPlant-Choate T-300 diesel motor scrapers (5).
Buckeye, Parsons trenchers, 120, 224, 250.
Blaw-Knox batch bins, silo, 100 tons—200 bbls.
B-Erie 2-¼ yd. shovel front att. for 52-55B.
Super C Tournapulls, Cummins (6).
Bucyrus 14 elec. 3-yd. dragline, on cats (West).
Allis-Chalmers gyratory crushers, 42", 30", 27".
Shovels, cranes, draglines, 1½ to 10 yds.
Sanford-Day 15-ton 36" ga. bottom dump cars (40).
Diesel-elec. generators, 150 to 875 KW.
Locomotives, 7 to 45 tons, gas, diesel.
Telsmith, Universal, crushing, screening plants.
Whirley gantry & locomotive cranes (4).
Rotary dryers, kilns (5).
Bucyrus 50B 2-yard steam and diesel cranes.

H. Y. SMITH CO.
828 N. Broadway, Milwaukee 2, Wis.

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BARBER-GREENE PORTABLE ASPHALT PLANT MODEL 842

Complete with Gradation Control Unit, Mixer and Dryer. Will sell as a complete unit or in part.

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